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ABSTRACT

The materials and ideas in this document are intended to be used by teachers in schools in order to bring adults and children together to experience good mathematics. It features an evening of hands-on mathematics scheduled for one night a week for four weeks. Students and adults come together to share mathematics activities, solve problems, and have fun with mathematics. The activities are intended for primary students. Sessions include measurement and geometry, number concepts and problem solving, estimation and calculators, and data collections and probability. Descriptions of each session and a list of materials are presented. The description of each session includes directions for preparations to be done prior to the event, guidelines on how to present each activity, and solutions to some of the explorations. Hard copies of all worksheets, overhead transparency masters, and graphics mats are included. (ASK)

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MATH OLYMPICS 2000/2002

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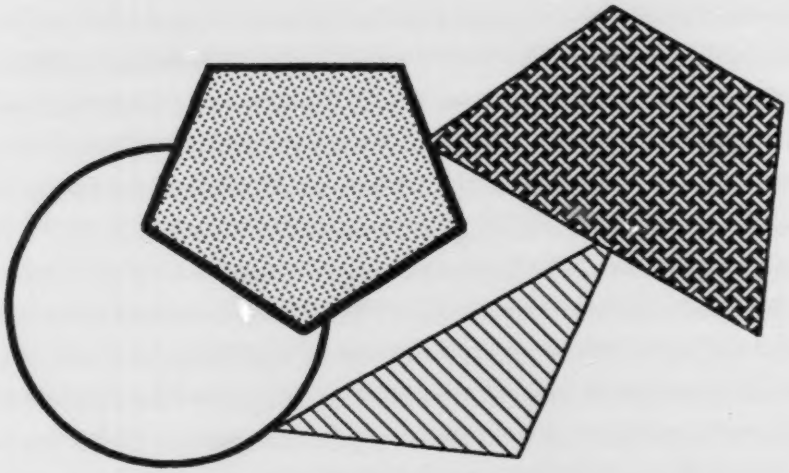
Primary Mathematics Fun for Communities of Children and Adults



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OVERVIEW
OF
PROGRAM

Math Olympics 2000/2002
Evening of Community Math Fun for Adults and Children
At the Primary Level

Purpose: The materials and ideas included in "Math Olympics 2000/2002" are intended to be used by teachers in schools throughout the world in order to bring adults and children together to experience good mathematics.

Description: This is an evening of hands-on mathematics scheduled one night a week for four weeks. Students and adults come together to share math activities, solve problems, and have fun with mathematics. The four-week program is based on the Olympics 2000 and 2002. It is designed to help develop interest in and comfort with higher-level thinking in mathematics for both students and adults.

Group Description: Ideally the group is made up of between 20 and 30 sets of adults and children from one or two grade levels. The activities included in this packet are intended for **primary** students. It is easier to work with students of the same approximate level than to mix primary and intermediate students in these sessions.

Timeline: One session per week for four consecutive weeks. Each session is one and one-half hours in length.
Session 1 - Measurement and Geometry
Session 2 - Number Concepts and Problem Solving
Session 3 - Estimation and Calculators
Session 4 - Data Collection and Probability

General Agenda: Each night will follow the same basic structure with adaptations as necessary, depending on the topic:

Warm Ups - As adults and children arrive, they put on name tags and work through four different stations of hands-on activities.

Activities - Led by the teacher leaders, adults and children work together on a variety of activities related to the math strand theme for the night. Most activities are hands-on and centered around adults and children working together to arrive at a solution.

Closure - As the evening comes to a close, the leader guides the participants through a review of the Warm-Ups from the beginning of the evening, awards the prize(s) for the closest estimate of Estimation Jar contents, assigns the homework for both the adults and the children for the week, and encourages them to come back for more fun next week.

Follow-Up Packets for Home Use: Each week participants receive a packet of activities related to the math strand theme of the session that they can use during the week to continue their fun and their investigation of mathematics.

Materials: The description of each session includes a list of the materials needed for use by the participants. Most of these materials are readily available in elementary schools. Hard copies of all worksheets, overhead transparency masters, or graphics mats are included in this packet for use during weekly sessions.

Description of Activities and Preparations: The description of each session includes directions for preparations to be done prior to the event, guidelines on how to present each activity, and solutions to some of the explorations.

SESSION
ONE

Measurement
And Geometry

Math Olympics 2000/2002 - Session 1
Topic: Measurement and Geometry

Warm Ups

- Nametags
- Estimation Jar
- Line Plot - Favorite Olympic Event
- Polygon Olympic Challenge
- Parent and Student Survey

Introductions

- Welcome and Introduction of Leaders
- What is Math Olympics 2000/2002
- Meet the Olympic Mascots: Olly, Syd, and Millie
- Olympic Challenge

Activities

- Designing the Olympic Dining Room
- Grandfather Tang at the Olympics
- Floor Exercise Mat Design - Patterns and Symmetry

Homework

- Olympic Event: Shapes & Solids Scavenger Hunt
- Olympic Village Path with Pattern Blocks
- More Challenges from Grandfather Tang
- Hand out and review packet for home

Closure

- Review warm ups, hand out prize(s) for estimation jar
- Incentives to return

Math Olympics 2000/2002 - Session 1
Topic: Measurement and Geometry
(Primary Grades)

Description of Activities and Preparation for Session Events

Set Up of Room

The room in which you hold Math Olympics 2000/2002 should be large: the cafeteria, the media center or library, or an open area. You will need tables centered before an overhead projector at which participants sit during the main activities of the sessions. You will also need tables around the outskirts of the room for the Warm-Up activities at the beginning of the evening. You will want a table for the Nametags near the door. You may also want a refreshment table if you plan to break halfway through the night for refreshments.

You may want to place baskets or boxes on each table that hold the materials needed for the main activities of the evening. Think about how best to organize your materials to eliminate "down-time" while waiting to dispense supplies.

Warm Ups

(The Warm Ups take longer the first night as participants get accustom to the routine.)

Nametags

Make or purchase nametags for each week so that everyone participating (leaders, children, and adults) has his or her name visible for others to see.

Make a sign for the Nametag Table that encourages people to sign in each week. Make a Sign-In Sheet, if desired, to keep track of who attends.

As the adults and children arrive the first night, have one leader greet them and point them toward the Nametag Table. Have colored markers available for the participants to write their names on the nametags.

After they sign in, encourage families to move to the other centers to begin exploring the warm-up activities.

Estimation Jar

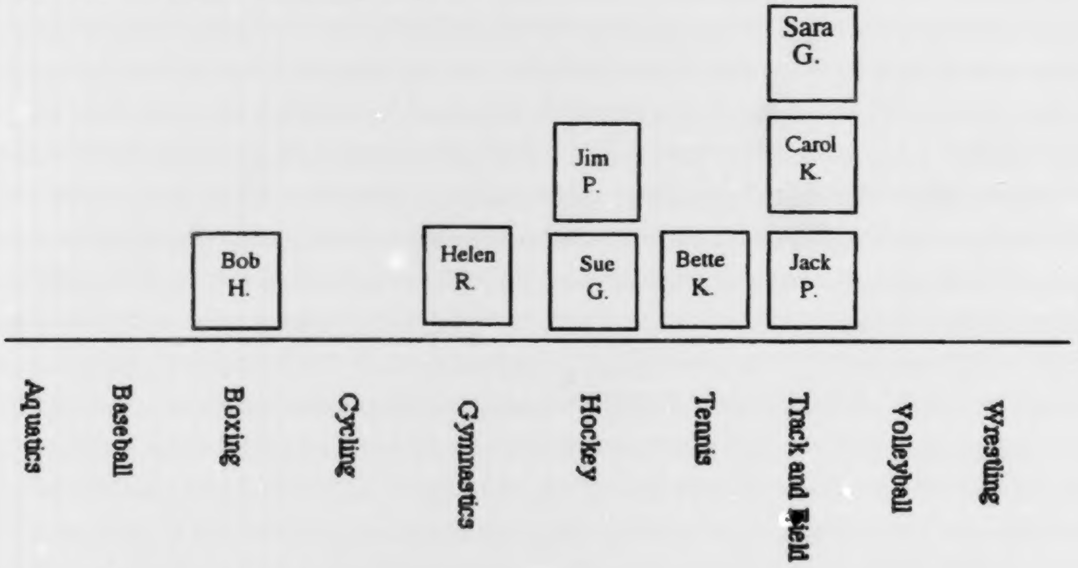
Each week fill the estimation jar (a quart mayonnaise jar or larger) with one kind of item (small dog biscuits, superballs, jar breakers, Hershey Kisses, etc.) Count the items prior to the night of the event, write the number of items in the jar on a piece of paper and tape it to the inside of the lid of the jar.

Make a sign for the "Estimation Jar" to be used each week at a warm-up center.

Each week participants are to record their estimates of how many of the item chosen for that week are in the jar.

Place pencils and pieces of paper near the jar on which participants can write their estimates and name. Place a basket near the jar in which participants can place their estimates.

Line Plot - Favorite Olympic Event



Make a line plot that includes between eight and ten of the events that will be part of the Olympics 2000. (A list of the events in included.) A sample line plot with a few participant responses already in place is pictured at the beginning of this section.

Provide sticky notes and markers so that each participant can record his or her name on a sticky note and place it above the event that is his or her favorite.

Polygon Olympic Challenge

Supply lots of toothpicks or stick pretzels, paper, and glue or tape for the following activity. Run copies the "Polygon Olympic Challenge" activity sheet and place it with the supplies at this warm-up center.

Make a sign "Polygon Olympic Challenge" to place at the center. If desired, make a sign that explains the activity.

Allow time for participants to try several of the challenges.

Adult and Student Survey

Run enough copies of the Adult survey and the student survey. Have participants fill them out as part of the warm-up session on the first night.

Make a sign "Adult and Student Survey Center." Place a basket near the sign for participants to turn in their surveys upon completion.

Introductions

Welcome and Introduction of Leaders

Gather your participants to the tables centered in front of the overhead projector. Welcome them with "Olympic" enthusiasm and introduce all leaders involved in the program.

What is Math Olympics 2000/2002

Explain that the mathematical challenges they will experience over the next four weeks are framed around the Olympics 2000 and 2002. Also explain that the purpose of this next four weeks is to give participants an opportunity to experience mathematics in a hands-on, fun way. Explain that they will be applying their mathematical understanding to solve problems, create designs, and realize just how much mathematics is a part of our everyday lives.

Meet the Olympic Mascots: Olly, Syd, and Millie

The Olympic Committee has created three Olympic Mascots for the Summer Olympics. They are Olly, Syd, and Millie. Using overheads of the pictures included in the Support Materials, introduce each of these mascots to the participants and share the background included about each one. You may want to enlarge pictures of them and hang them around the room for the children to see each week.

Olympic Challenges

Explain that mathematics doesn't always look like math. Sometimes there are no numbers, no basic operations. Sometimes it is filled with logic and problem solving.

One of the problem-solving strategies that students are taught in mathematics is to draw a picture. Encourage participants to apply this strategy or any other one they prefer as they listen to the "Olympic Challenges" and try to solve them.

Read the "Olympic Challenges" one at a time. Provide paper and pencils for the participants to use. Allow time for children and adults to work together to solve each problem. As participants share their solutions, ask them to share how they solved it. Ask if anyone solved it another way. Discuss the fact that there are many ways to solve the same problem and that students are encouraged to use a variety of strategies during their mathematical instruction. Use as many challenges as time allows.

Activities

Designing the Olympic Dining Room

Using overhead pattern blocks (if you have them), introduce each block to the participants. Begin with the green triangle and ask what they can tell you about this shape: You will get responses such as:

- It's green.
- It has three sides

- It has three angles (corners, points).
- It is a triangle.
- All the sides are equal.
- All the angles are equal.

Work your way through all of the shapes to be used in this activity (green triangle, blue rhombus, red trapezoid, and yellow hexagon).

Share the overhead transparency "Designing the Olympic Dining Room" with your participants. Discuss any questions they might have. If not on the table already, distribute the pattern blocks, crayons, and "Olympic Table Tops" record sheet to participants. Allow time for them to create their tabletops and record all of the designs they could find.

Allow time for the participants to share their designs. How many different designs did they find? How many possibilities were there? Did they find them all? See the Olympic Table Tops – Solution Sheet for all possible solutions.

Grandfather Tang at the Olympics

Share the tangram with the participants using either overhead tangram pieces or the overhead transparency of the tangram.

Explain that the tangram is the oldest known mathematical puzzle requiring special equipment. It is a Chinese puzzle. Technically speaking the pieces of the puzzle are called tans and the finished arrangements made from the pieces are called tangrams. The object of using the tangram puzzle is to make specific designs using all seven tans with no overlapping.

When tangrams are used in storytelling, the storyteller arranges the tans to show the shape of a character in the tale. As new characters or story elements are introduced, the puzzle pieces are rearranged to represent the new character or new element.

The fox fairies in Grandfather Tang's Story are an integral part of Chinese folklore. They are believed to be endowed with supernatural powers of transformation. Fox fairies are said to live for eight hundred to a thousand years.

Introduce the book Grandfather Tang's Story by Ann Tompert to the participants. Read the story to the group sharing overhead transparencies of the different animals as you progress. (Masters of the tangram animals are included in your support materials.)

After reading the story, share the overhead transparency of "Grandfather Tang Brings His Stories to the Olympics" with the participants. Distribute the tangram puzzles (already cut if not commercially purchased). Also distribute copies of the tangram animals for the participants to use, if needed. Model using the tangram pieces to make the first fox on the overhead projector.

Provide time for participants to complete their animals and add color and characteristics. Ask participants to share their creations with the group. You can collect these to display at the next session, if you wish.

Patterns and Symmetry for the Floor Exercises

The Floor Exercise in the Gymnastic competition is a beautiful event. The Olympic Committee has decided to hold a contest to find a design to put on the mat on which this event takes place. (Note: The real Olympics Committee is NOT holding this contest - this is an activity for our Math Olympics only.)

Explain that they have the opportunity to create a design based on the criteria listed on the Contest Sheet. Review the criteria using the overhead transparency of the Contest Sheet, distribute pattern blocks, paper, crayons or markers, and rulers for participants use to complete this activity.

Allow time for participants to share their designs with the group.

Homework

Explain to the participants that they will take home a packet of activities each of the first three weeks of the Program. They will be asked to do at least one of the activities included. Decide which one you most want them to do or assign all of them, if you wish. Ask them to bring back at least one of them the following week to share with the group.

Distribute Packets: Distribute the packets to each student/adult pair reminding them that the homework assignment and the materials needed for the homework are included in the packet. Explain that some of the activities that they experienced tonight are also in the packet so they can revisit them during the week. In addition, there are several new activities for them to explore. Review the contents and answer any questions they may have.

Packet Contents:
Olympic Event: Shapes & Solids Scavenger Hunt
Olympic Village Path with Pattern Blocks
Pattern Block Master
Grandfather Challenges You Again!
Tangram Puzzle Master
Tangram Animals from Granfather Tang's Story
Polygon Olympic Challenge

Olympic Event: Shapes & Solids Scavenger Hunt
This homework assignment asks the participants to search through their home looking for two- and three-dimensional shapes in their environment. They are to record their findings on the "Shapes and Solids Scavenger Hunt" tally sheet.

Olympic Village Path with Pattern Blocks
Participants are asked to use the paper pattern blocks to make a curving path to be used in the Olympic Village.

Grandfather Tang Challenges You Again!
Grandfather Tang offers the participants the challenge of making other things with the tangram pieces.

Closure

Review each of the warm ups.

Line Plot: Talk about the Line Plot of Favorite Olympic Events. Which was the most popular one? Which the least? Did any get the same number of votes? How do you know?

Polygon Olympic Challenge: Allow participants to share some of the polygons they made. Did any participants follow the same directions and get different polygons? How could that be? How many solutions might there be for some of the challenges?

Estimation Jar: (During the evening have one leader sort through the estimation responses and select the best one or two estimates.) Talk about strategies the participants used to arrive at their estimates. Announce the winner of the Estimation Jar contest and give them a prize (I Love Math button, math pencil, etc.) Remind participants that the Estimation Jar will be a part of each session during the Math Olympics 2000/2002.

Incentives to Return: Ask if the participants have enjoyed the evening. Talk about some of the topics you will explore in the next week or two. Encourage them to return for more fun next week. Remind them to **do their homework!!**

THINGS TO DO BEFORE SESSION ONE

Communication to Families of Students

Copy and send out letter announcing the Math Olympics 2000/2002 Program through which families register both students and adults.

Shortly before your program begins, copy and send out the "reminder" letter to all participants included in the program.

Supplies to Gather or Purchase

nametags
colored markers
crayons
pencils
baskets for collecting estimates and surveys
estimation jar
contents for estimation jar
sticky notes
small pieces of paper for estimation responses
toothpicks or stick pretzels
blank paper
glue or tape
pattern blocks (either purchased, made from enclosed pattern, or Ellison Machine)
tangrams (either purchased, made from enclosed pattern, or Ellison Machine)
rulers
prizes for estimation awards
Grandfather Tang's Story by Ann Tompert (ISBN #0-517-57487-X)

Things to Make

Signs for centers (Estimation, Favorite Olympic Event, Polygon Olympic Challenge, Adult/Student Survey)
Line Plot on chalkboard or large paper for Favorite Olympic Event
Tangrams, if not purchased
Enlarged colored copies of the three Olympic Mascots: Olly, Syd, & Millie

Papers to be copies for use DURING Session 1

Polygon Olympic Challenge
Adult Survey
Student Survey
Olympic Table Top Recording Sheet
Tangram Patterns (if commercial tangrams were not purchased or available)

Packet Contents to be copied for use at Home

Title Page
Shapes and Solids Scavenger Hunt Olympic Event
Shapes and Solids Scavenger Hunt Recording Sheet
Olympic Village Path with Pattern Blocks
Pattern Blocks
Grandfather Challenges You AGAIN!!
Tangram Patterns
Tangram Foxes
Tangram Rabbit and Dog
Tangram Squirrel and Hawk
Tangram Turtle and Crocodile
Tangram Goldfish and Goose
Tangram Lion
Polygon Olympic Challenge

Overhead Transparencies to Make for use DURING Session 1

Polygon Olympic Challenge
Geoboard Olympic Challenge
The Olympic 2000 Mascots
Individual Mascot Sheets (optional - could be read to group as they look at all three mascots)
Olympic Challenges #1, #2, and #3
Designing The Olympic Dining Room
Olympic Table Tops Recording Sheet
Grandfather Tang Brings His Stories to the Olympics
Tangram Patterns
Tangram Foxes
Rabbit and Dog
Tangram Squirrel and Hawk
Tangram Turtle and Crocodile

Overhead Transparencies to Make for use DURING Session 1 (continued)

Tangram Goldfish and Goose
Tangram Lion
Floor Exercise Mat Design Contest
Pattern Blocks (if overhead pattern blocks are unavailable) – add color
Shapes and Solids Scavenger Hunt Directions and Chart
Olympic Village Path with Pattern Blocks
Grandfather Challenges You Again!

√ Letters to Families of Students about Math Olympics 2000/2002

Math Olympics 2000/2002

__________, 2001

Dear Parents,

We are pleased to offer a Math Olympics 2000/2002 program for ___ graders and adults (parents or grown-up friends of the student) at your school. Math Olympics involves adults and children **working together** to learn about mathematics through hands-on activities.

There are four sessions included in the program and they will be on the following dates:

______________________________ ______________________________

______________________________ ______________________________

Each night of the program will focus on a different topic.

If you would like to attend the Math Olympics program at ______________ Elementary School, please return the slip below to ______________________. Because of space, we will only be able to accept 30 pairs of students and adults, so we will honor those who turn in the slips first.

We hope to see you there!

Sincerely,

____

________________ Elementary School

Student's Name ______________________ Adult's Name __________________

Teacher _____________________ Home Phone Number ____________________

We plan to attend all four nights of the Math Olympics 2000/2002 to be held on:

______________________________ ______________________________

______________________________ ______________________________

Math Olympics 2000/2002

__________, 2001

Dear ________________ and __________________,

This is a reminder to you about the Math Olympics sessions coming up on the following dates:

__________________________, __________________________,

__________________________, __________________________,

We are looking forward to seeing you there!

Sincerely,

____

____

Math Olympics 2000/2002

__________, 2001

Dear ________________ and __________________,

This is a reminder to you about the Math Olympics sessions coming up on the following dates:

__________________________, __________________________,

__________________________, __________________________,

We are looking forward to seeing you there!

Sincerely,

____

____

Session One

- √ Support Materials
- √ Masters of activities sheets
- √ Masters of Overhead Transparencies
- √ Master of Home Packet

List of Sports and Disciplines for the Sydney 2000 Olympic Games

Choose 8 or 10 for the Line Plot activity for Session 1.

- Aquatics
  - Diving
  - Swimming
  - Synchronized Swimming
  - Water Polo
- Archery
- Athletics (Track and Field)
- Badminton
- Baseball
- Basketball
- Boxing
- Canoe / Kayak
  - Slalom
  - Sprint
- Cycling
  - Road
  - Mountain Bike
  - Track
- Equestrian
  - Dressage
  - Jumping
  - Three-day Event
- Fencing
- Football
- Gymnastics
  - Artistic
  - Rhythmic
  - Trampolining
- Handball
- Hockey
- Judo
- Modern Pentathlon
- Rowing
- Sailing
- Shooting
- Softball
- Table Tennis
- Taekwondo
- Tennis
- Triathlon
- Volleyball
  - Beach Volleyball
  - Volleyball (indoor)
- Weightlifting
- Wrestling
  - Freestyle
  - Greco-Roman

POLYGON OLYMPIC CHALLENGE

Working together, complete each of these events using toothpicks (or stick pretzels), paper, and glue or tape. If you prefer, simply draw each solution on paper.

EVENT 1: Make a four-sided shape in which all sides are equal and all angles are square. Write the name of this shape next to it.

EVENT 2: Make a four-sided shape in which all sides are equal BUT the angles are NOT equal. Do you know the name of this shape? If so, write it down.

EVENT 3: Make a four-sided shape using six toothpicks which is NOT a square. Write its name down.

EVENT 4: Make a three-sided shape using as many toothpicks as you like. What is the name of this shape. Can you make other types of this shape using the toothpicks? Record those as well.

EVENT 5: Using 8 toothpicks, make as many different figures as you can. Record each by either gluing them down or drawing them on paper. If you know their names, write them next to each figure.

ADULT SURVEY
MATH OLYMPICS 2000/2002

Respond to the following statements by circling yes or no.

I enjoy doing mathematical problems	Yes	No
I liked mathematics when I was in school.	Yes	No
I use mathematics in my profession.	Yes	No
I like doing brain teasers.	Yes	No
I enjoy working with my child in mathematics	Yes	No

One of my most positive school memories of a mathematics class was ____

____

ADULT Involvement Counts!

STUDENT SURVEY - MATH OLYMPICS 2000/2002

- **Circle the face that tells how you feel about each statement.**

☺ = Agree   😐 = Not Sure   ☹ = Disagree

1. I like solving problems. ☺ 😐 ☹
2. I like working with other students to solve problems. ☺ 😐 ☹
3. I like to get my math work done as fast as possible. ☺ 😐 ☹
4. I think math is easy. ☺ 😐 ☹
5. I like helping others in class and in groups. ☺ 😐 ☹
6. I would like extra work in math. ☺ 😐 ☹

7. I like math when it is used in other subjects. ☺ 😐 ☹

8. I enjoy challenges in math. ☺ 😐 ☹

9. I like writing about how I solved a problem. ☺ 😐 ☹

10. I enjoy talking to others about math. ☺ 😐 ☹

11. I try very hard in math. ☺ 😐 ☹

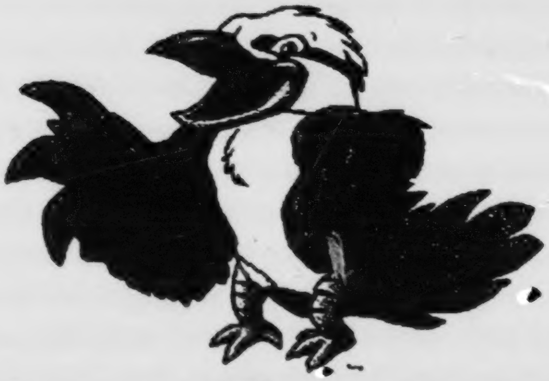
12. Math is one of the subjects I really like. ☺ 😐 ☹

13. I like to work alone in math. ☺ 😐 ☹

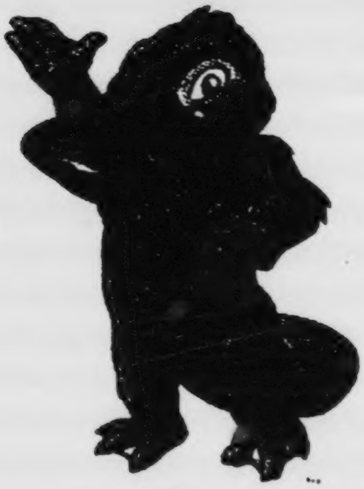
14. I like to read about math outside of class. ☺ 😐 ☹

15. I like to work on problems and puzzles in my spare time. ☺ 😐 ☹

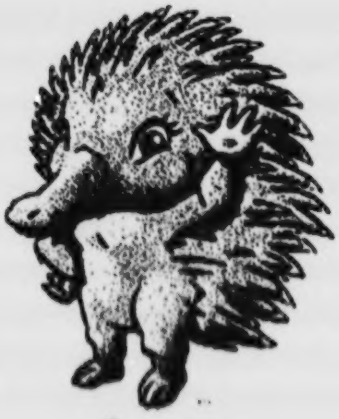
THE OLYMPIC 2000 MASCOTS



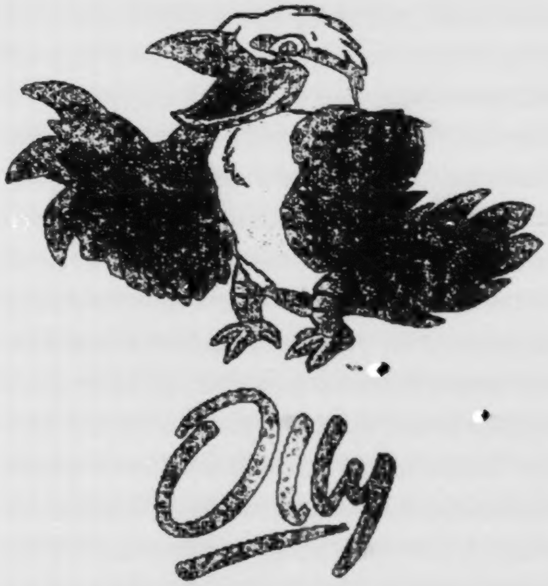
Olly



Syd.



Millie



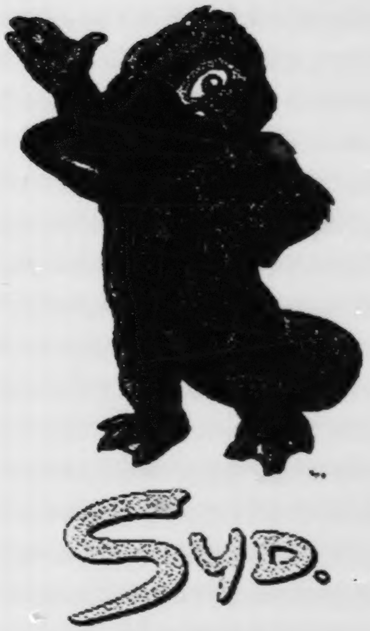
One of the Mascots

Gregarious, honest, enthusiastic and openhearted, Olly epitomizes the Olympic spirit of generosity and universal friendship. A fact-finder, commentator, and flighty communicator, he is always whizzing around the world collecting the latest news. Olly doesn't mind having a go with the other athletes now and again, and what he lacks in patience, he more than makes up for with speed. A do-it-yourself philosopher, Olly's eye is always on the big picture. Altruistic and loyal, Olly is never motivated by self-interest or greed.

About the Kookaburra

The largest of all kingfishers, the kookaburra roosts in small leafy trees and eats small mammals, snakes, and large insects, such as termites. Kookaburras are family-oriented. They grow to 42 centimeters tall and weight about 500 g. They are brown with a grayish-white underside. The tail has dark bands and the face has cheek patches. The males have distinctive blue markings on their wings. Kookaburras are common everywhere in Australia, in both city and country. Its call is distinctive - a very loud, strange, human-like laugh.

Adapted from /www.olympics.com/eng/sydney/index.html



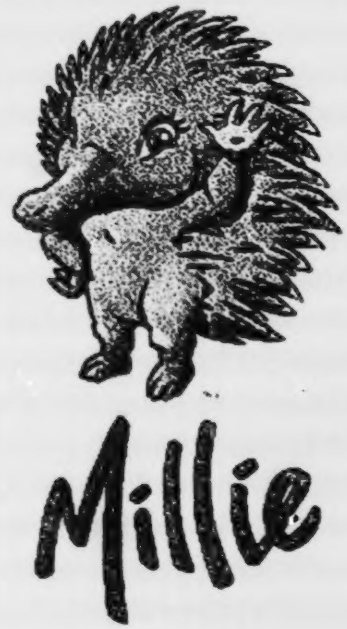
One of the Mascots

Syd, the platypus, named after the site of the Games, is a team player and a natural leader. Focused, dynamic and enthusiastic, Syd represents the environment and captures the vigor and energy of Australia and its people. He's a team player and tenacious little digger who's not afraid to get the job done. His sturdy body and muscular limbs give him the speed, agility and power to excel at most sports, although swimming is his favorite. Candid and self-effacing, Syd has a laconic Aussie sense of humor.

About the Platypus

This unique Australian mammal has the bill of a duck, the body of an otter and the tail of a beaver. It lays eggs and has mammary glands but no teats. The platypus and the echidna are the only egg-laying mammals in the world (monotremes). The male averages about 50 centimeters long and weights about 1.7 kilograms. It has a smooth swimming action using special webbed forefeet. Platypuses live in elaborate tunnels or burrows up to 20-meters long within riverbanks. They live on a diet of crustaceans, mollusks, frogs, worms, and insect larvae.

Adapted from /www.olympics.com/eng/sydney/index.html



One of the Mascots

Millie, the echidna, personifies the dawn of hope and optimism in a new millennium in the year 2000. A techno-whiz and information guru, she is a storehouse of information with all the facts and figures at her fingertips. A confident young woman, she is a sharp and witty observer who always takes notes and produces new ideas. Agile and precise, she loves any sport that involves accuracy and strategy. Decisive, analytical, sharp and assertive, she believes it is possible to help build a more peaceful world by educating through sport.

About the Echidna

The echidna is found widely around Australia. It has a well-developed brain and shows strong signs of high intelligence. Often known as the "spiny anteater," the echidna is covered with stout spines and bristly hair. It eats ants and termites, using its extraordinary long tongue (up to 18 centimeters) covered with sticky secretion like treacle. Echidnas are the platypus' closest living relative. The echidna is about 30 centimeters long and weighs about 7 kilograms.

Adapted from /www.olympics.com/eng/sydney/index.html

OLYMPIC CHALLENGE # 1

Syd, Olly, and Millie, the Olympics Mascots for the Sydney Olympics are running an Olympic Event for children.

The children are riding bikes and tricycles. There are five children riding bikes and four children riding tricycles. How many wheels are there in the event?

Draw a picture to help you solve the problem. Be ready to explain your thinking.

OLYMPIC CHALLENGE #2

Syd, Ollie, and Millie, the Olympic Mascots, offered to carry supplies to the stadium.

They found a wagon that will hold four boxes of supplies at a time.

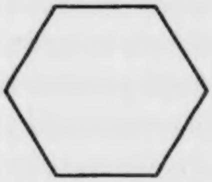
There are 27 boxes of supplies that they need to deliver to the stadium for tomorrow's events. How many trips will Syd, Ollie, and Millie need to make in order to deliver them?

OLYMPIC CHALLENGE #3

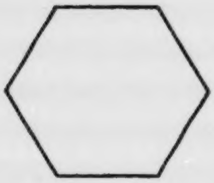
Since the Summer Olympics are being held in Australia, the Olympic Committee wants to include animals that live in Australia throughout the events.

They plan to use Kangaroos and Koala Bears in the Opening Day Parade. Kangaroos have two feet. Koala's have four.

If there are nine animals in the parade and there are 24 legs in the parade, how many are Kangaroos and how many are Koala Bears? Draw a picture or use manipulatives to solve this problem.



DESIGNING THE OLYMPIC DINING ROOM



You have been asked to design the tables for the Olympic Athletes' dining room. You want to use a hexagon as the basic shape of your tables BUT you want to make as many different table tops as possible.

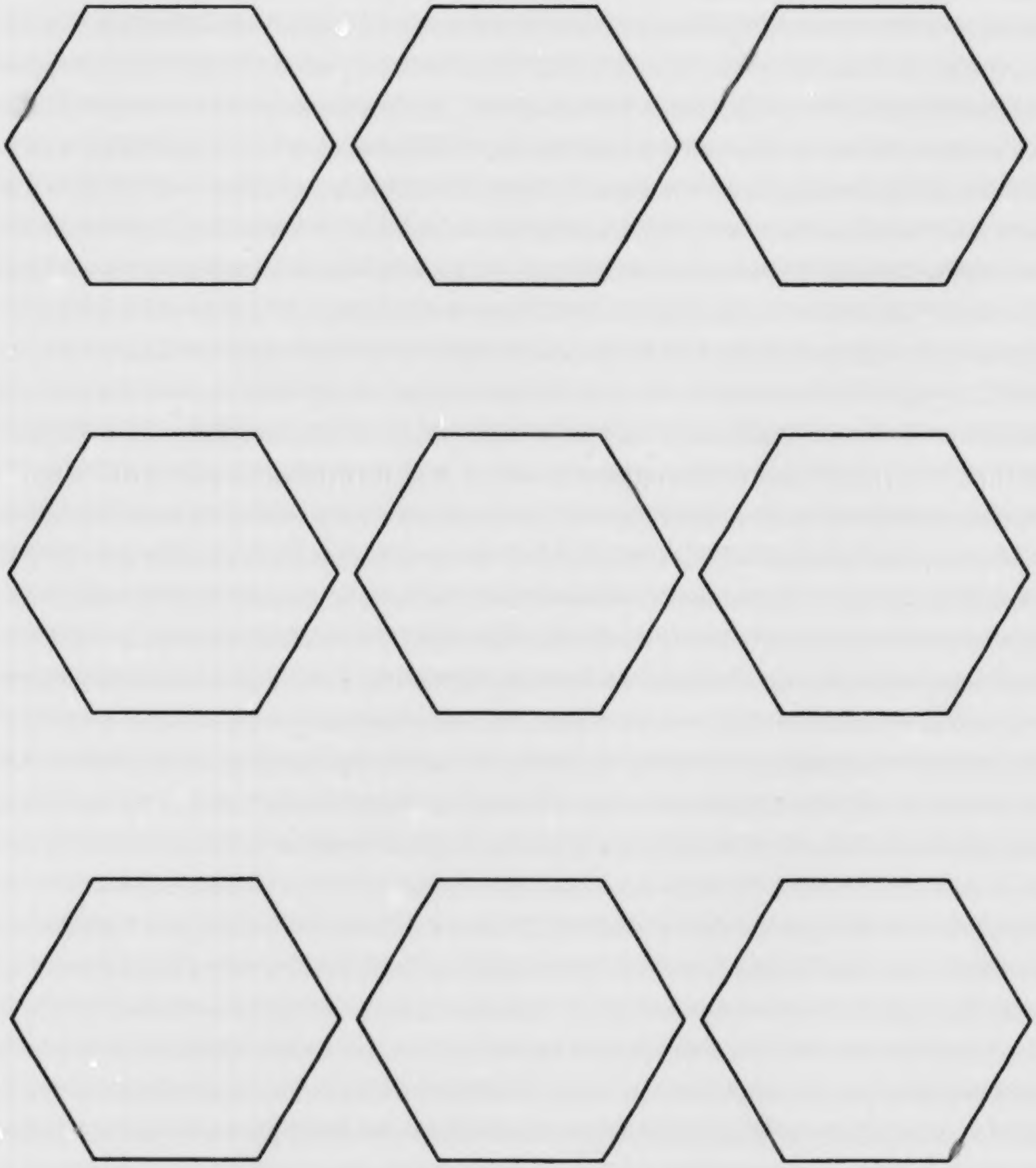
Use pattern blocks to make as many different table tops as possible. Use as many the following shapes to cover a table top the size of one yellow hexagon:

yellow hexagon
red trapezoid
blue rhombus
green triangles

Record your designs on the "Olympic Table Top Design Sheet." Use crayons to color your drawings to match what you made with the pattern blocks. How many did you make? Are there any other possibilities?

Olympic Table Tops

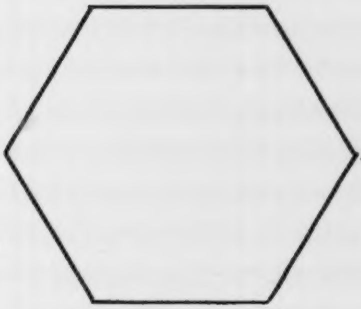
Record the different table tops that you can make with pattern blocks for the Olympic Athletes' Dining Room.



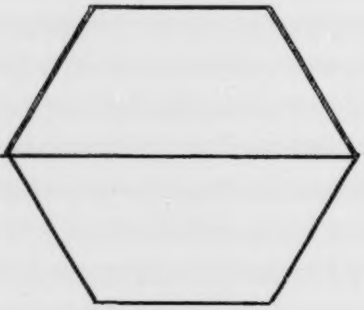
Olympic Table Tops - SOLUTIONS

Record the different table tops that you can make with pattern blocks for the Olympic Athletes' Dining Room.

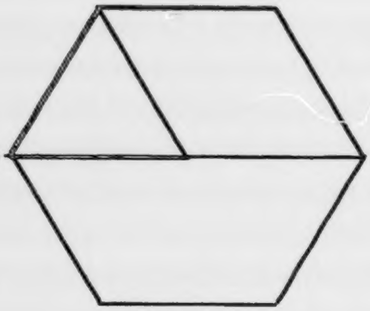
1 yellow
hexagon



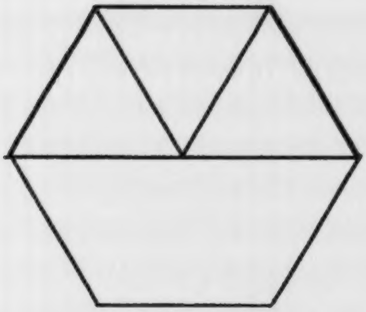
two red
trapezoids



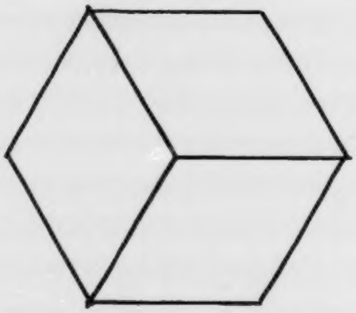
1 green triangle,
1 blue rhombus, &
1 red trapezoid



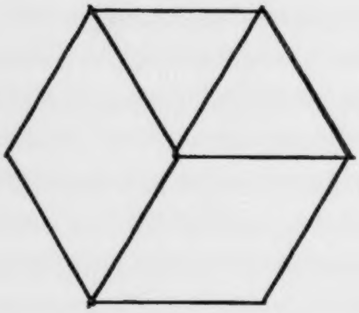
3 green triangles and
1 red trapezoid



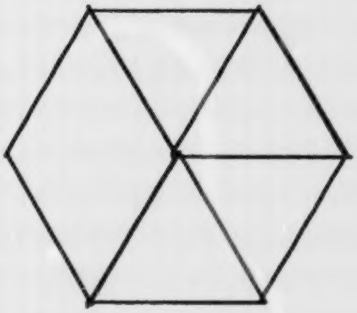
3 blue
rhombuses



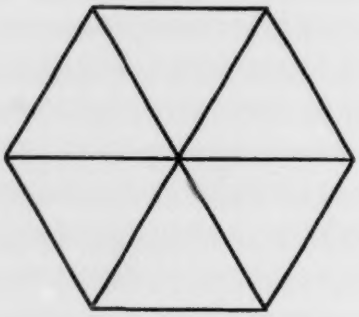
2 green triangles &
2 blue rhombuses

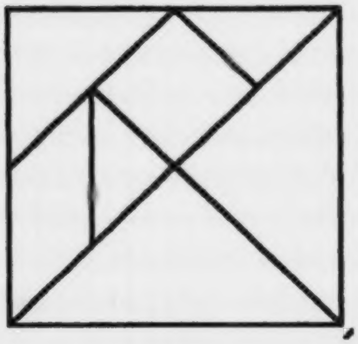


1 blue rhombus &
4 green triangles



6 green
triangles





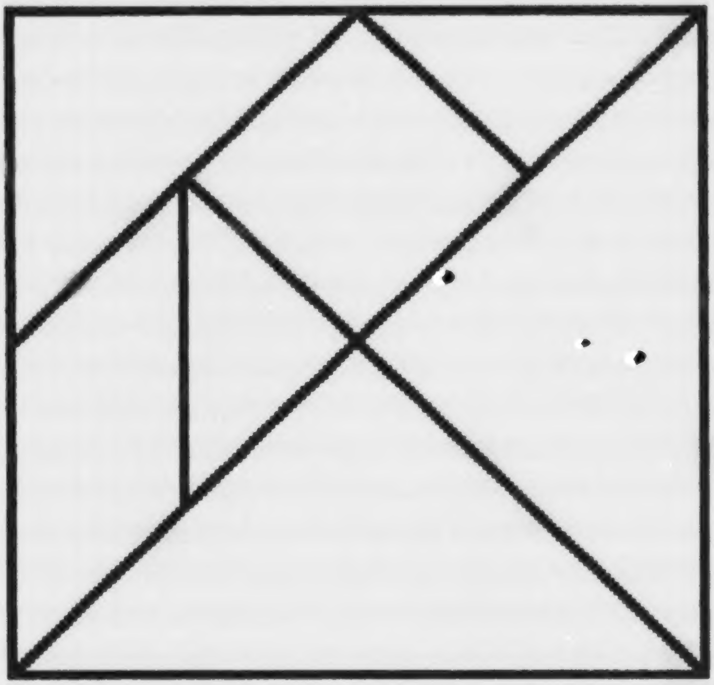
Grandfather Tang Brings His Stories to the Olympics

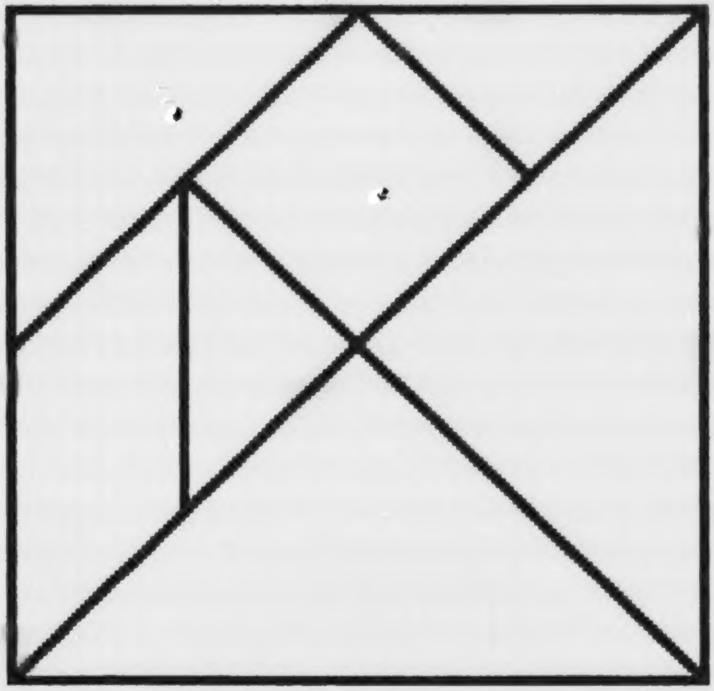
Grandfather Tang brought his granddaughter to the Olympics to cheer on the athletes. He also brought his wonderful characters from his book, Grandfather Tang's Story by Ann Tompert.

Use your tangram pieces to create the animals from his story (foxes, rabbit, dog, squirrel, hawk, turtle, crocodile, goldfish, goose, and lion) or other animals of your choice.

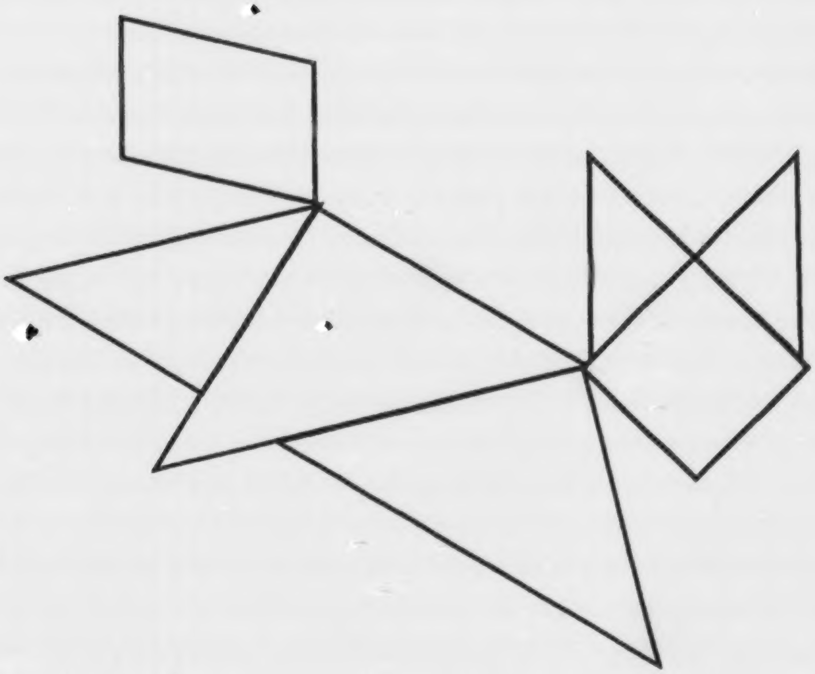
How many different animals can you make? Trace your animals on a piece of paper to share with the group. Add color, eyes, or whatever you wish to make your tangram animal lifelike.

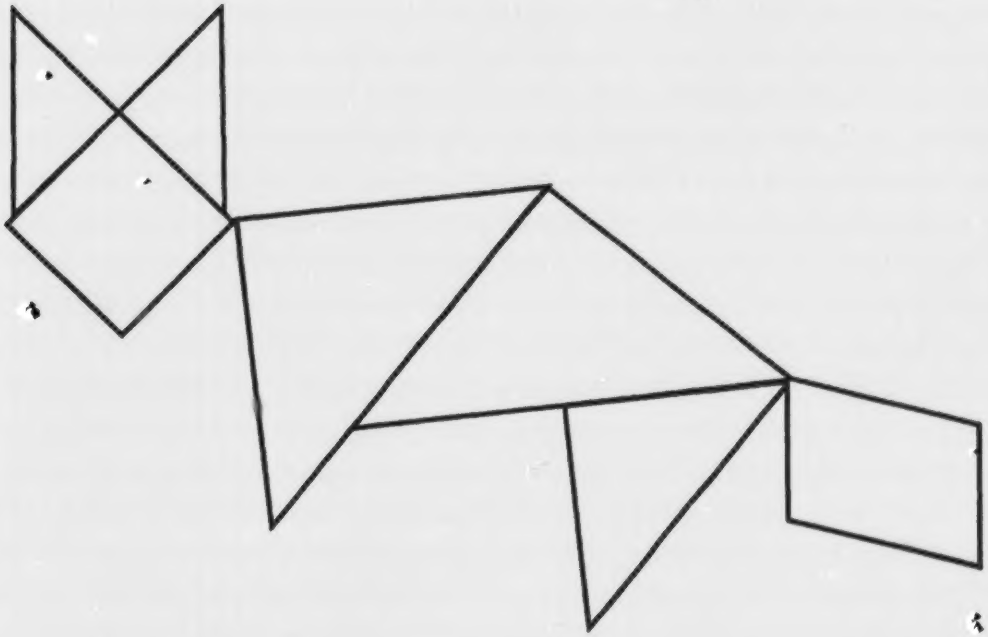
TANGRAM PATTERNS



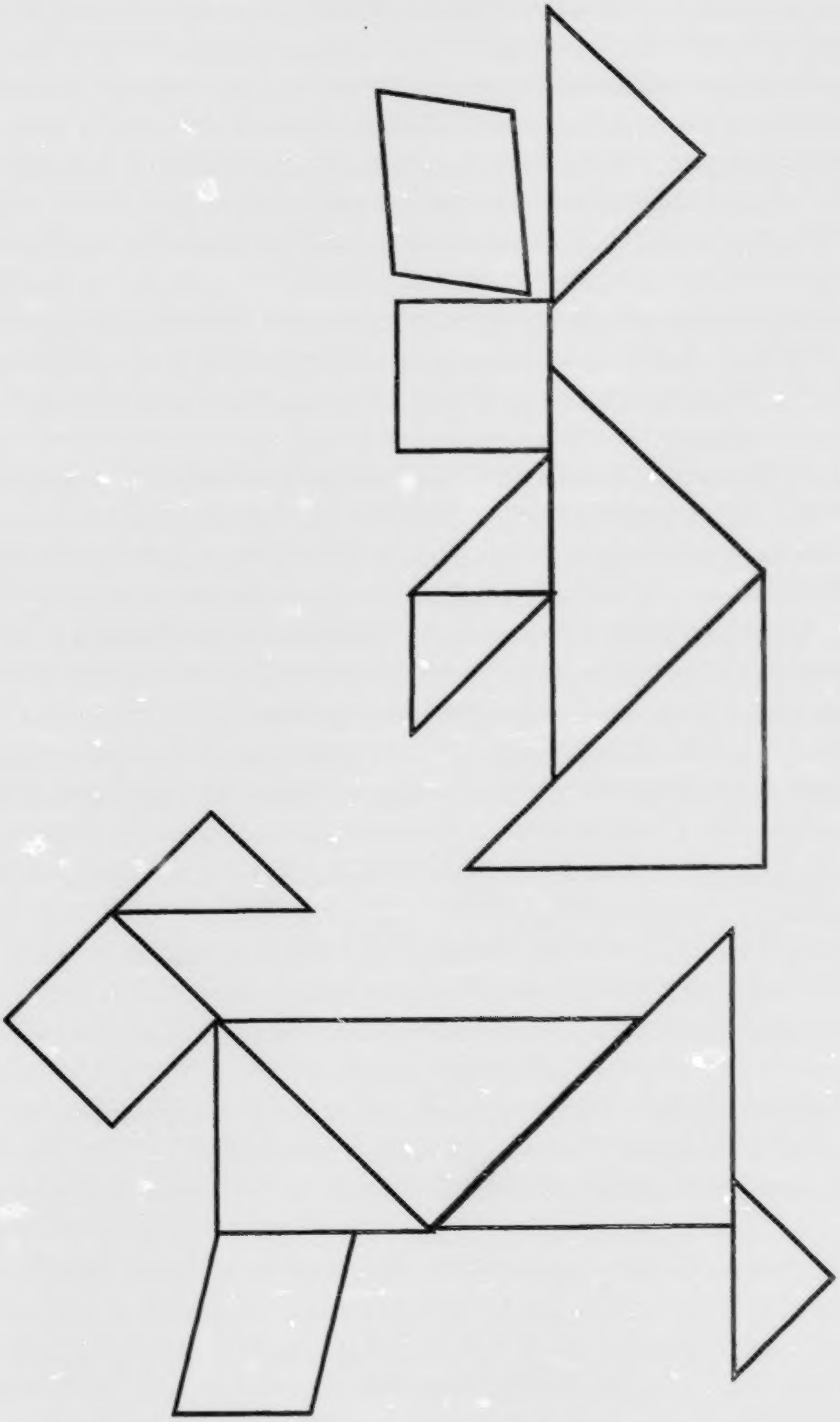


Tangram Foxes

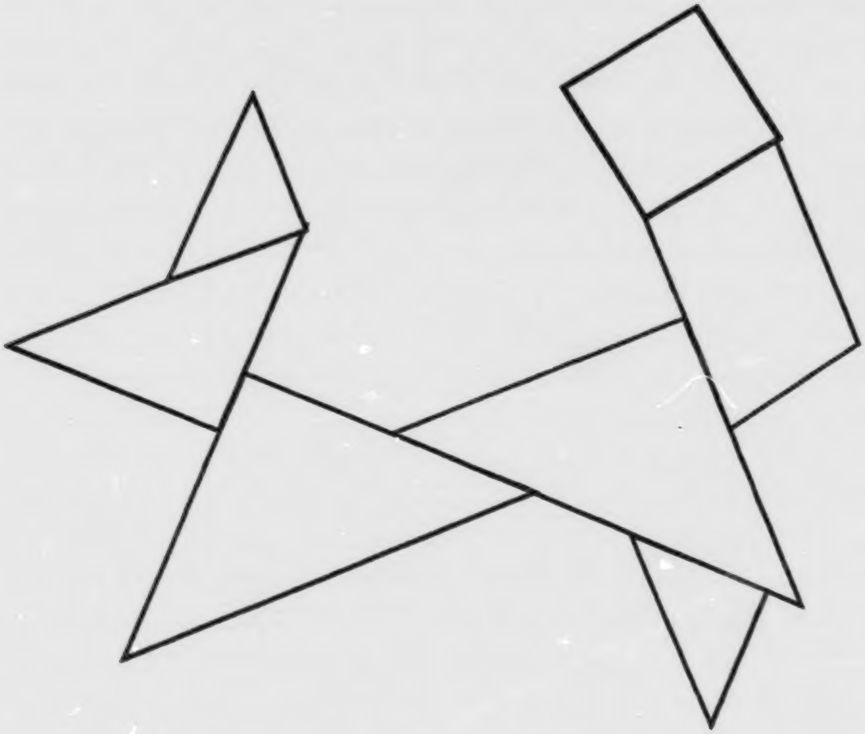


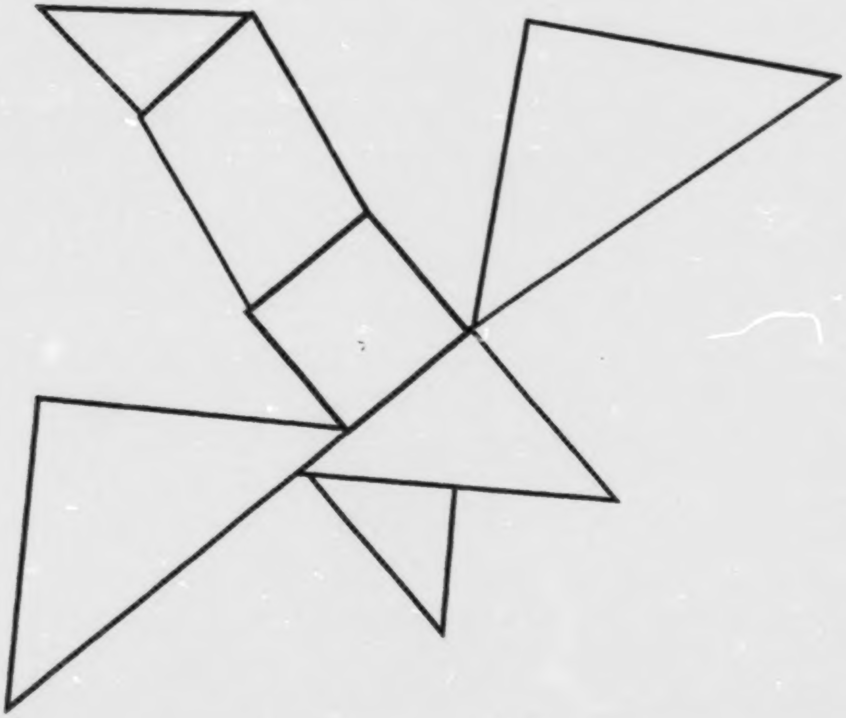


Rabbit and Dog

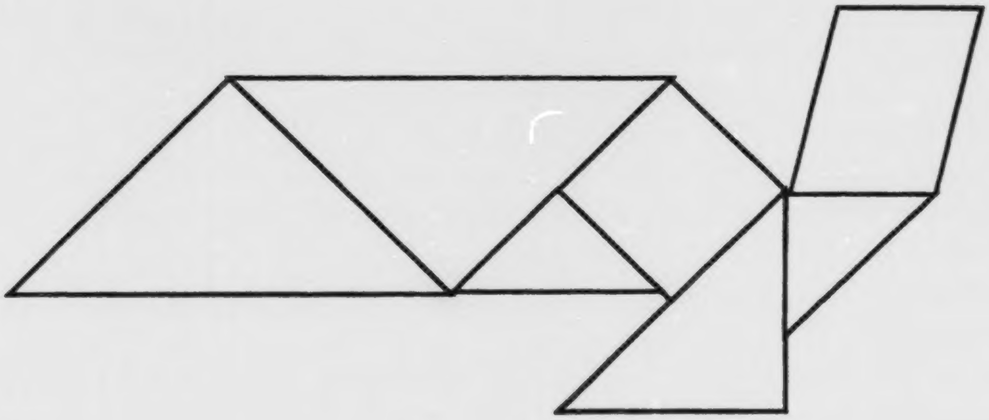


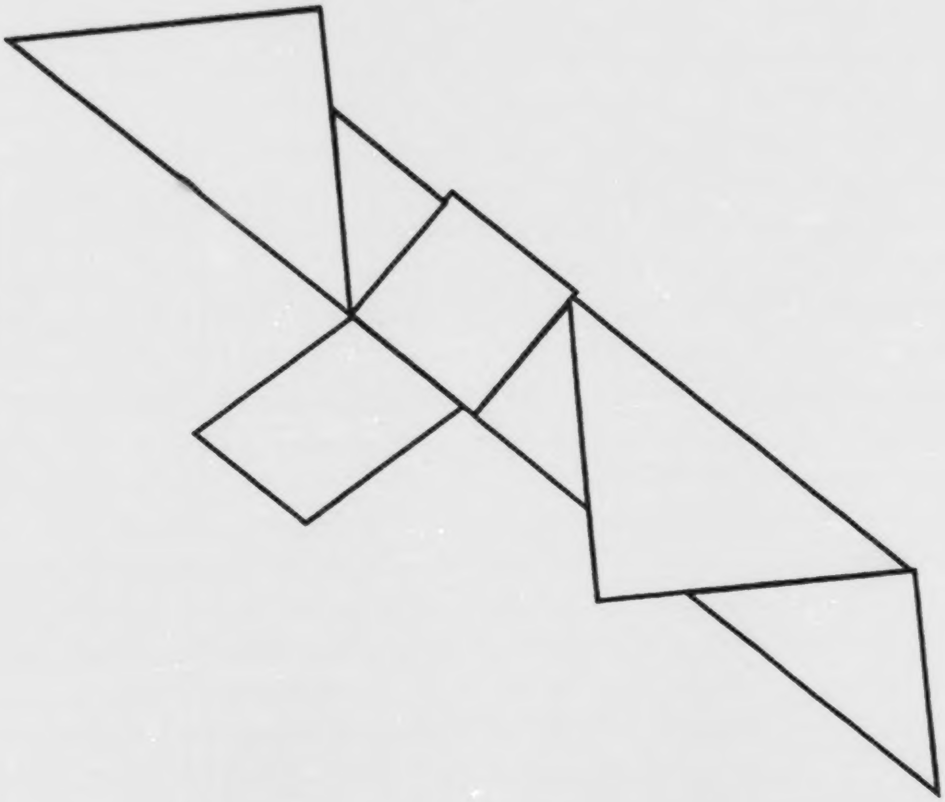
Tangram Squirrel and Hawk



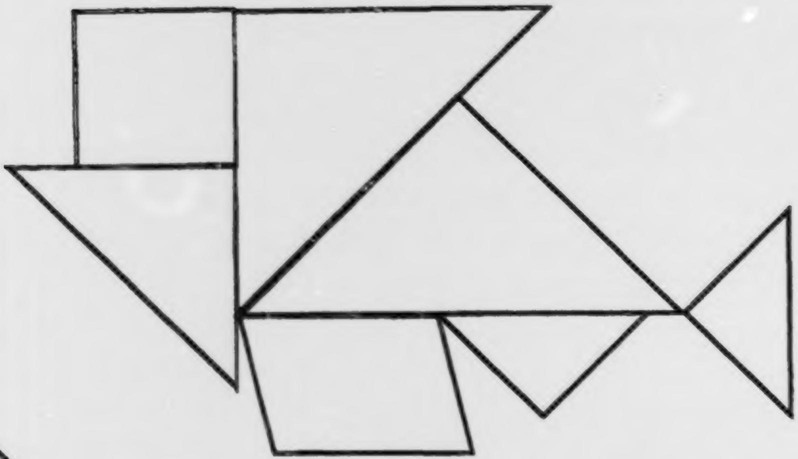


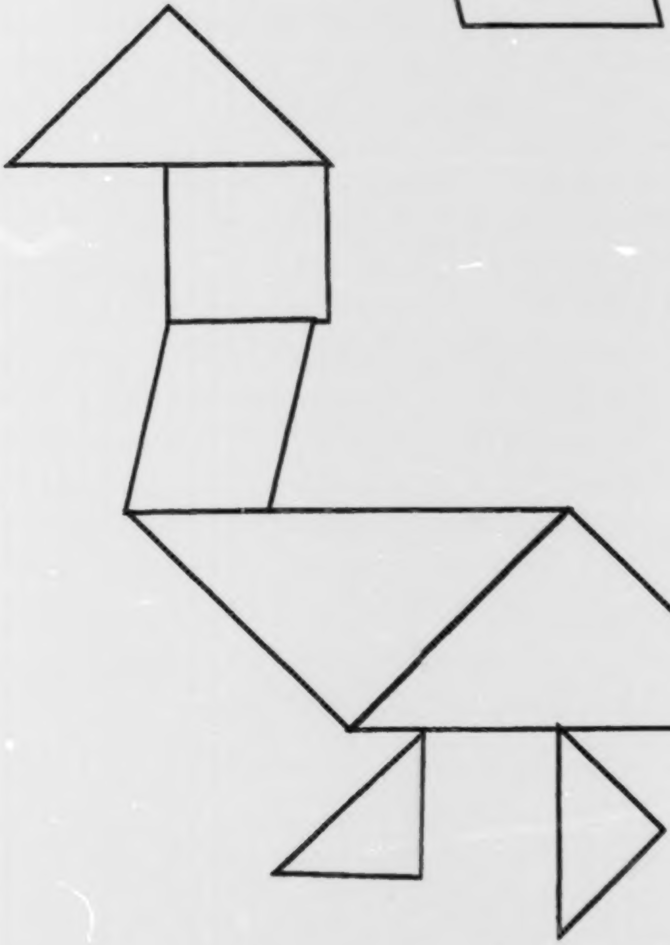
Tangram Turtle and Crocodile



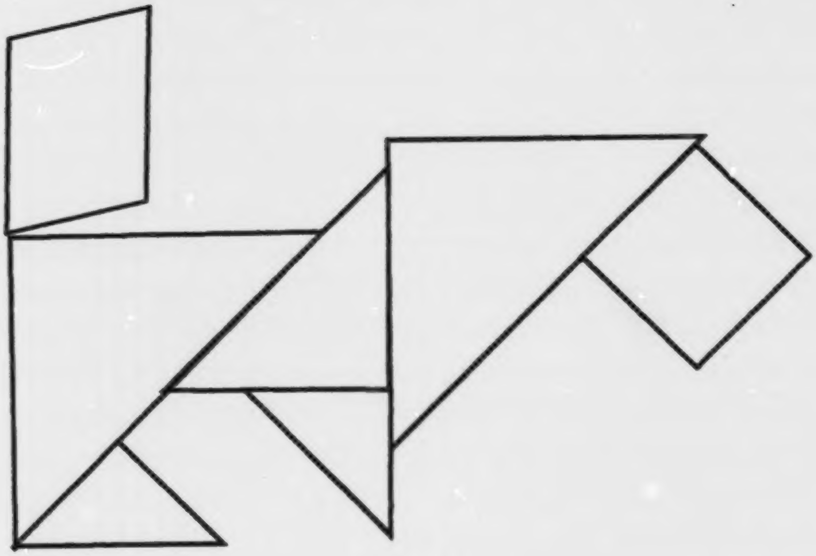


Tangram Goldfish and Goose





Tangram Lion



FLOOR EXERCISE MAT DESIGN CONTEST

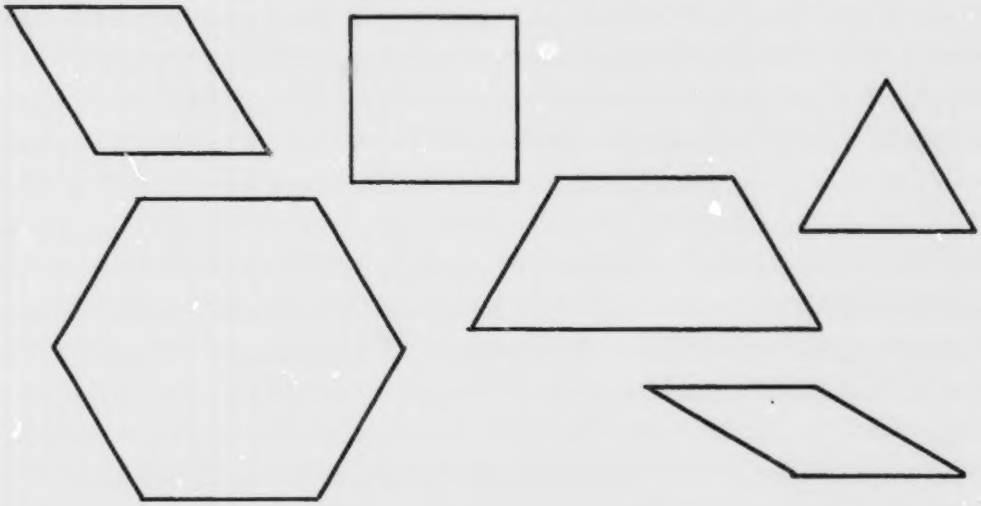
Use pattern blocks to design a symmetrical pattern to be imprinted on the mat used for the Floor Exercises in the Olympics 2000.

Make sure that your design:

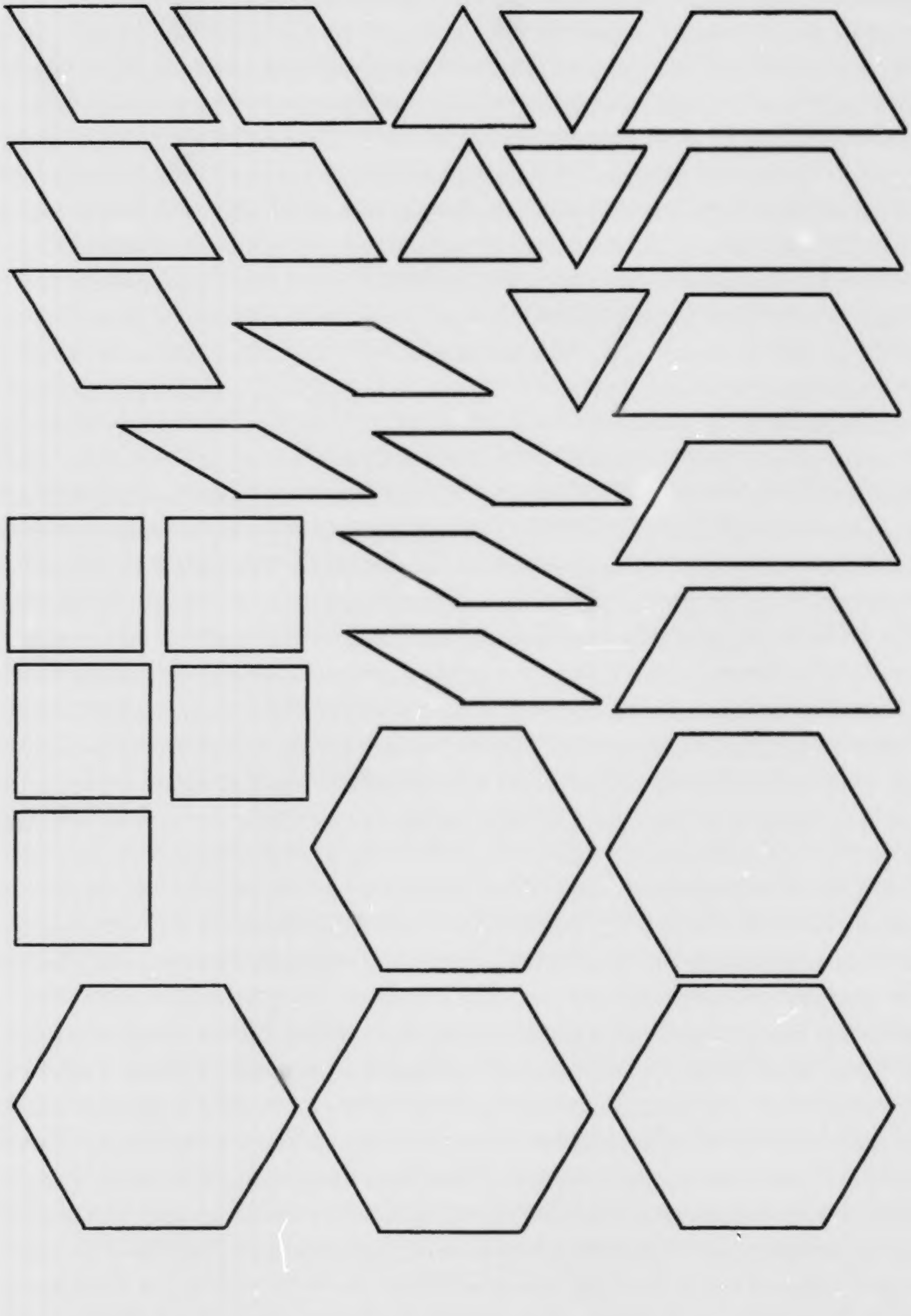
- uses at least three different types of pattern blocks
- uses 10 or more pattern blocks
- has at least one line of symmetry

Once your have created your design with pattern blocks, trace it on paper by outlining each block included. Then color each block to match its true color.

Be ready to share your design with our group.

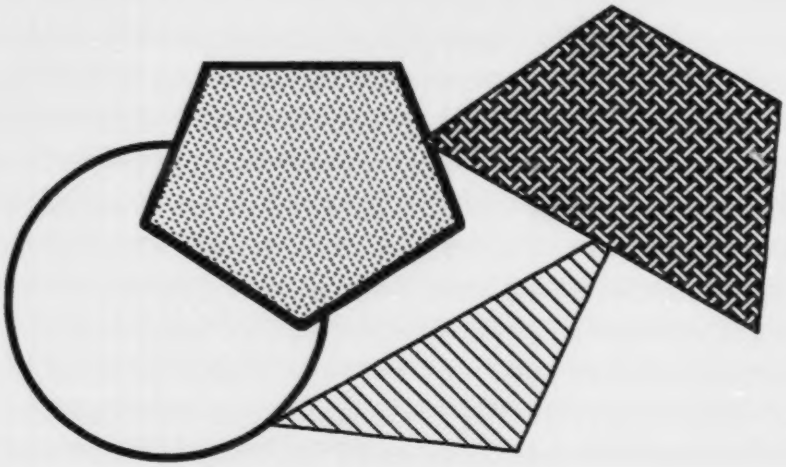


PATTERN BLOCKS



MATH
OLYMPICS
2000/2002

Primary Mathematics Fun
for Children and Adults to Share
at Home



Week One

SHAPES AND SOLIDS SCAVENGER HUNT OLYMPIC EVENT

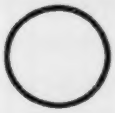
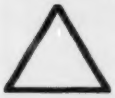
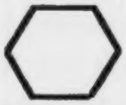
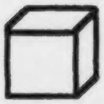
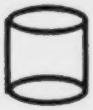
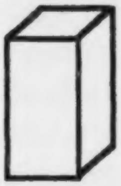
As a team go through your home from room to room. You can even go outside. Look for the two- and three-dimensional shapes listed on the chart.

Make sure you look carefully for shapes in flooring, wallpaper, or fabric.

Tally the number of different shapes that surround your life.

Make a graph to display your data. Which shape did you see most often? Why? Which shape could you not find at all?

Shapes and Solids Scavenger Hunt

OLYMPIC VILLAGE PATH WITH PATTERN BLOCKS

- Color and cut out the pattern blocks on the next sheet.

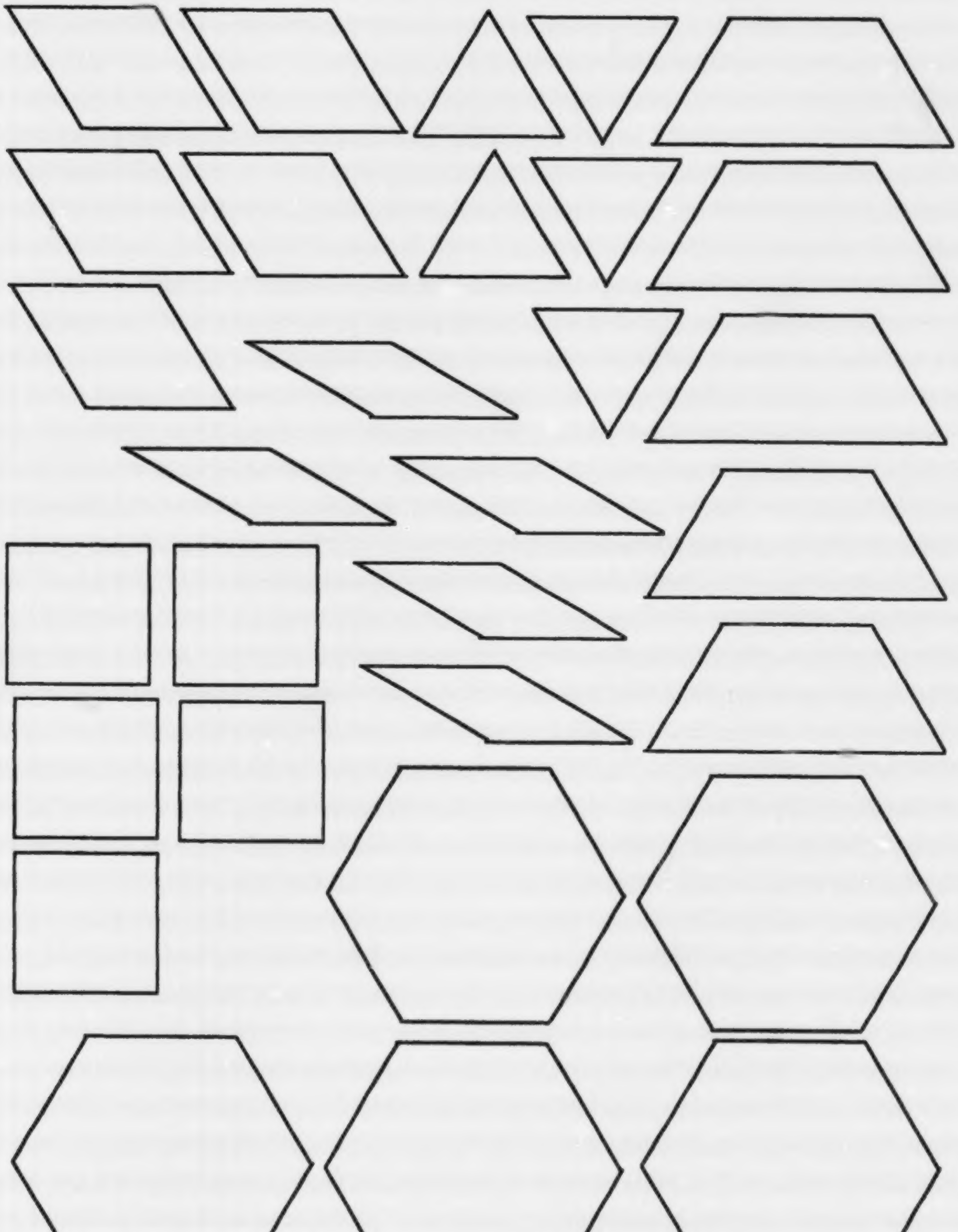
- Use them to design a path through the Olympic Village that has a repeating pattern in it.

- Make sure that the path IS NOT a straight line but curves at least once.

- Glue your design to a large piece of paper.

- Draw different Olympic Buildings as well as trees, plants, or benches to complete your design.

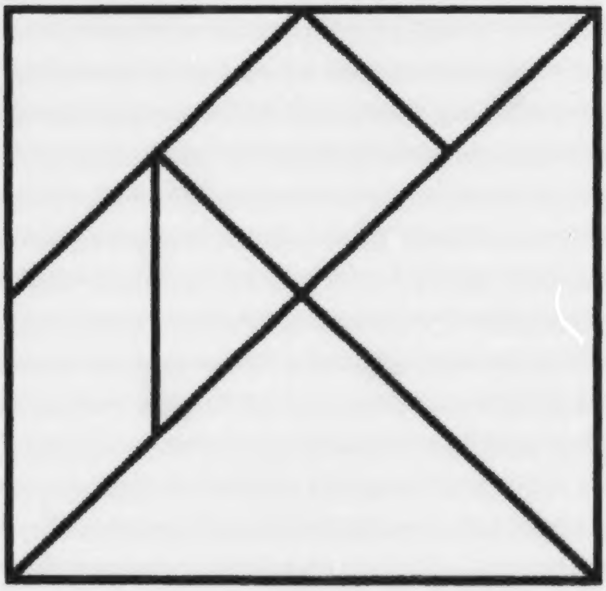
PATTERN BLOCKS



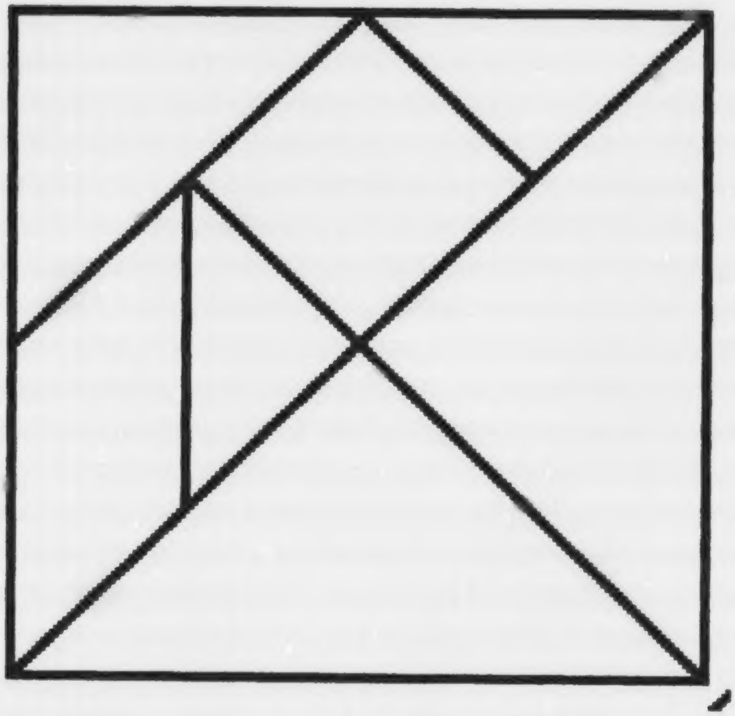
Grandfather Challenges You AGAIN!!

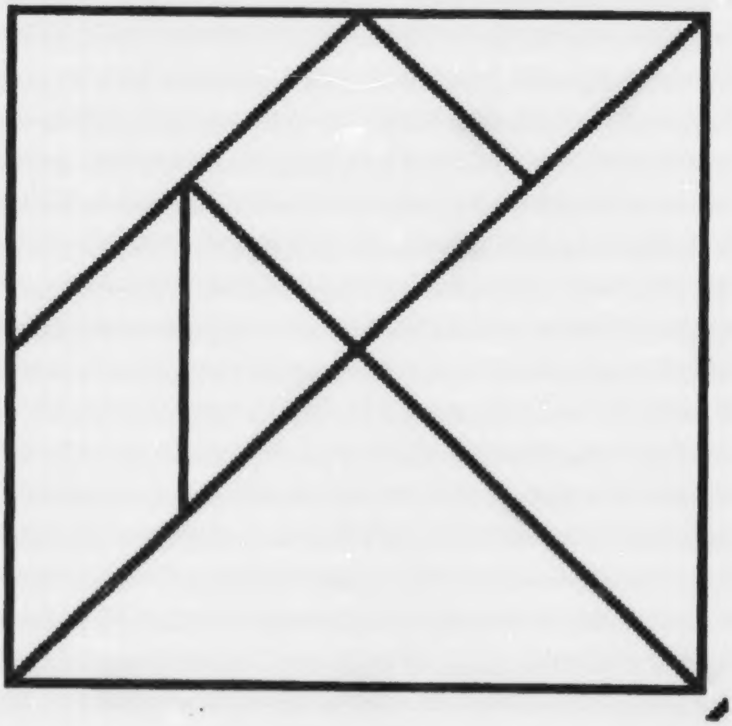
What other things can you make with the tangram pieces? Make as many different things as you can. Then trace each one and write what it is next to it.

Make sure you bring your creations to class next week to share.

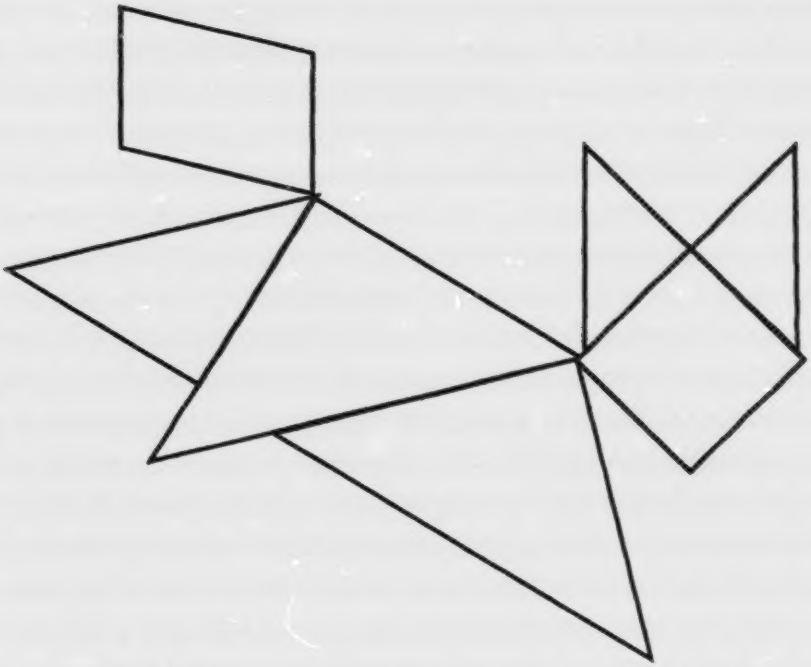


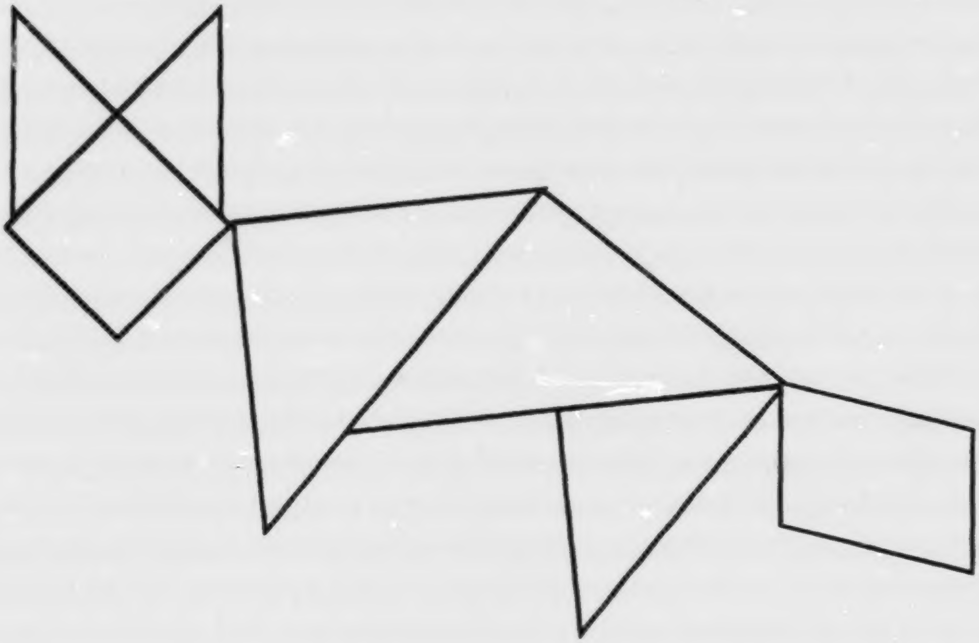
TANGRAM PATTERNS



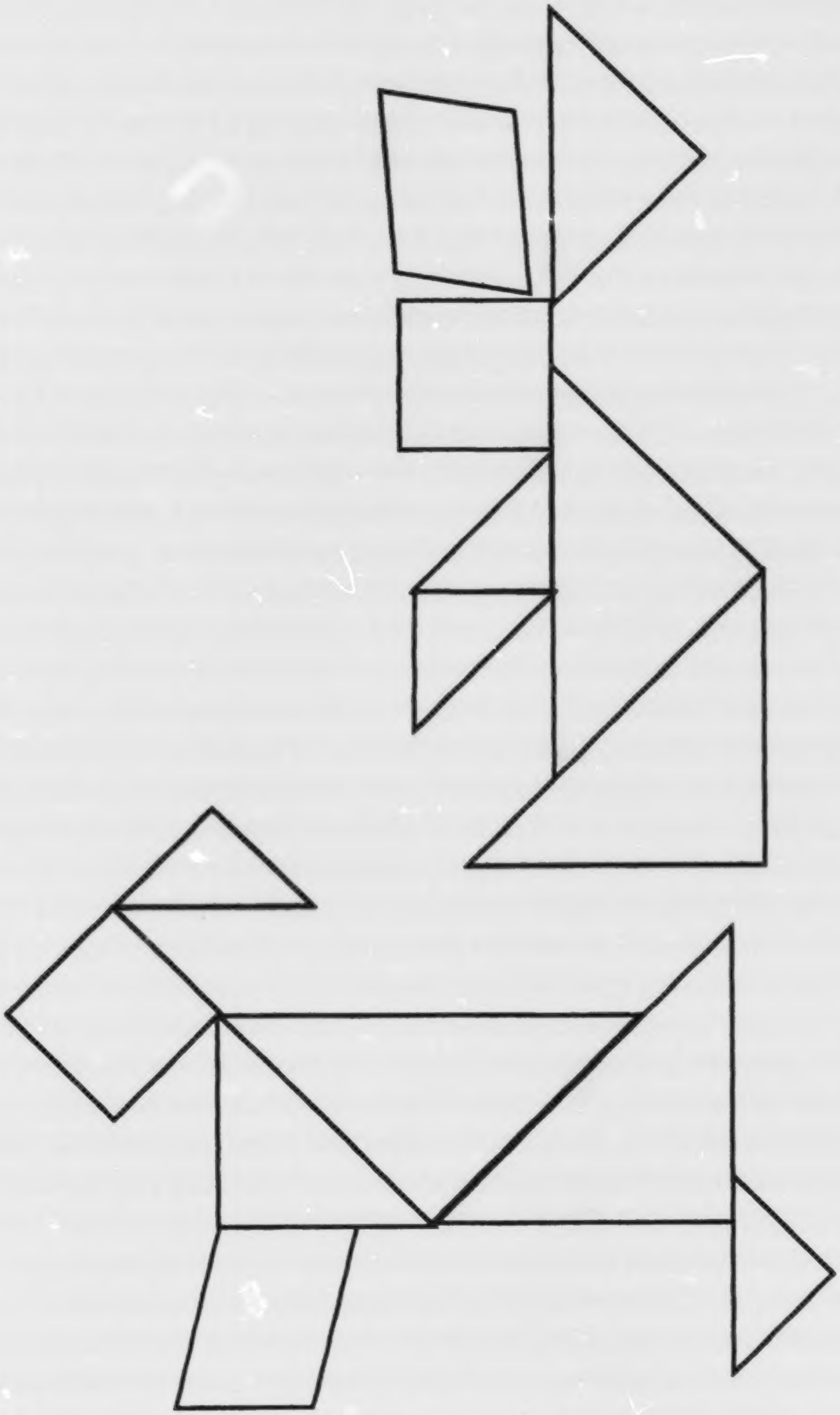


Tangram Foxes

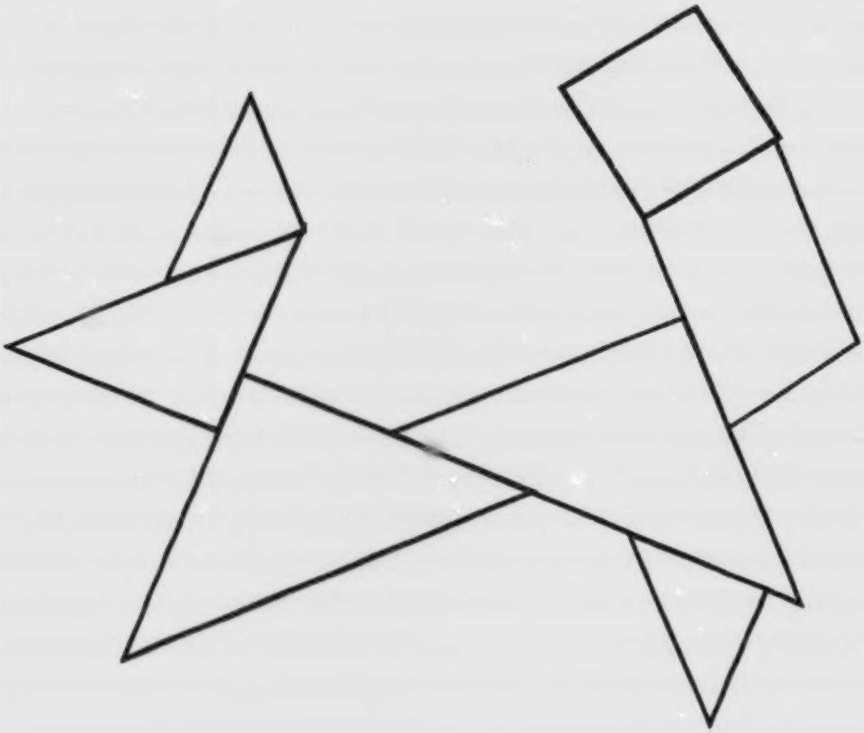


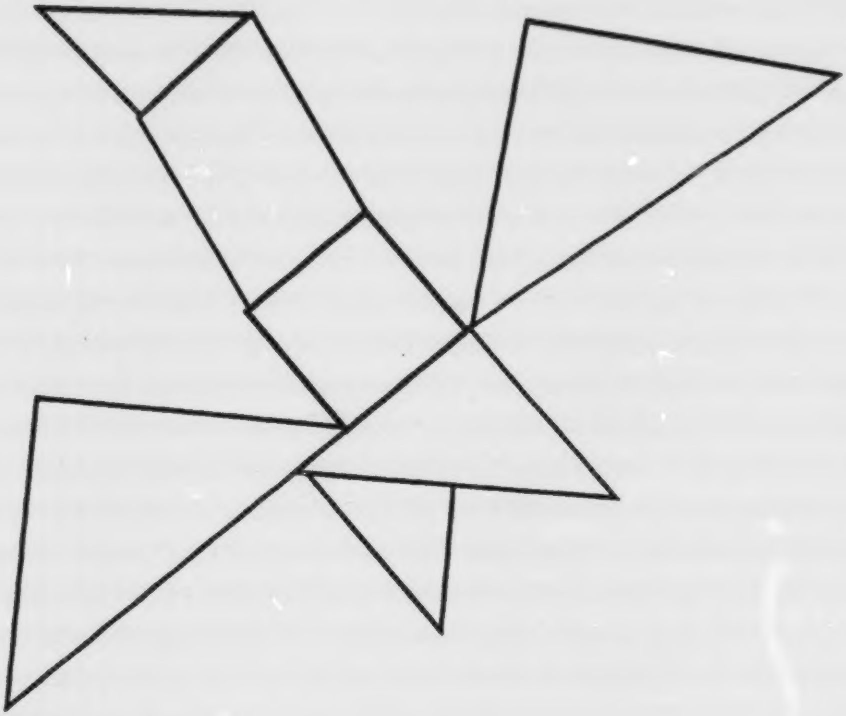


Rabbit and Dog

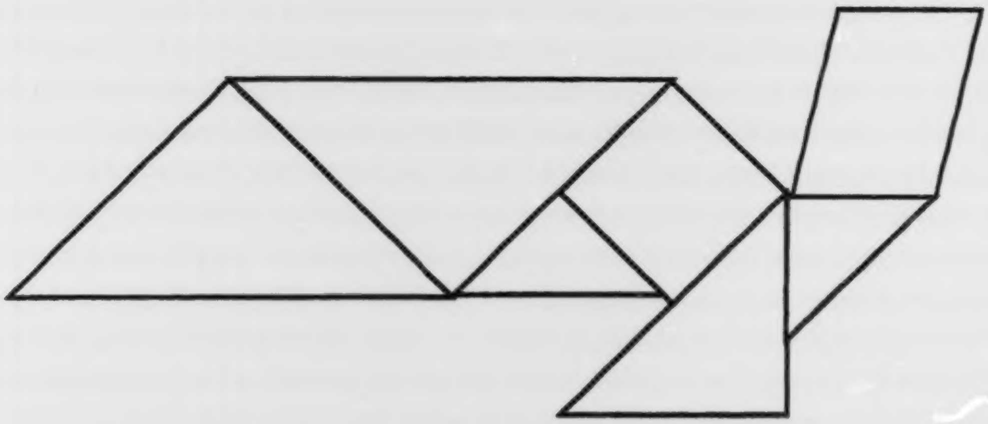


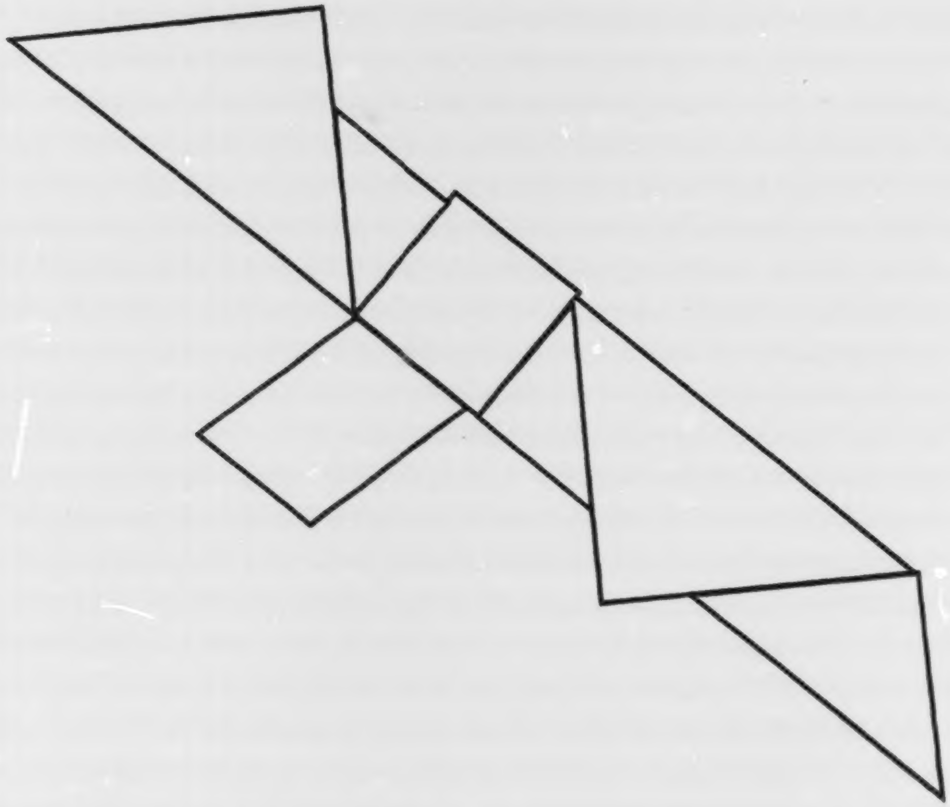
Tangram Squirrel and Hawk



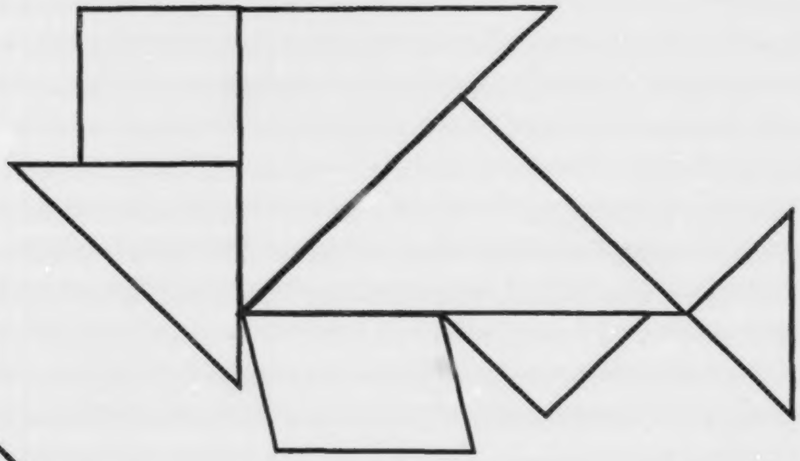


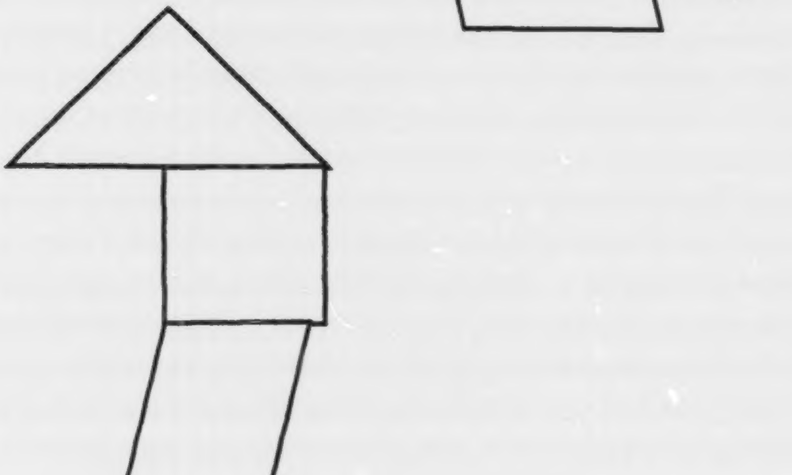
Tangram Turtle and Crocodile



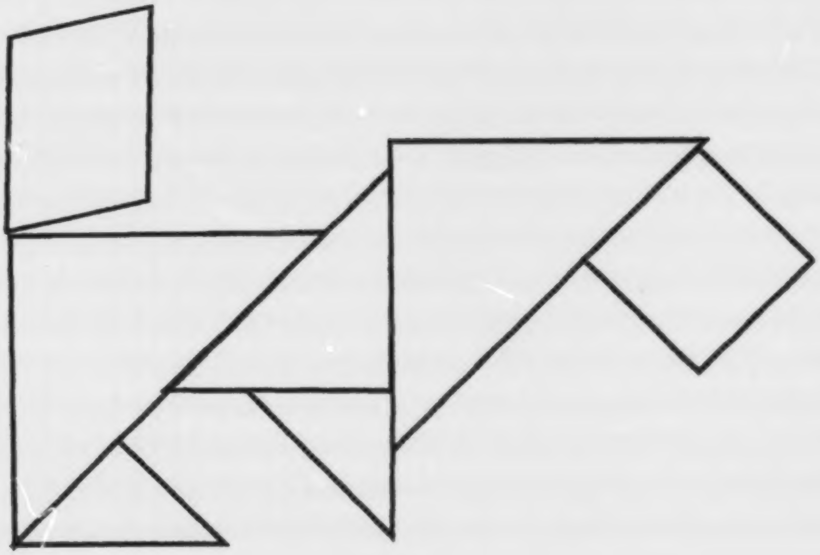


Tangram Goldfish and Goose





Tangram Lion



POLYGON OLYMPIC CHALLENGE

Working together, complete each of these events using toothpicks (or stick pretzels), paper, and glue or tape. If you prefer, simply draw each solution on paper.

EVENT 1: Make a four-sided shape in which all sides are equal and all angles are square. Write the name of this shape next to it.

EVENT 2: Make a four-sided shape in which all sides are equal BUT the angles are NOT equal. Do you know the name of this shape? If so, write it down.

EVENT 3: Make a four-sided shape using six toothpicks which is NOT a square. Write its name down.

EVENT 4: Make a three-sided shape using as many toothpicks as you like. What is the name of this shape. Can you make other types of this shape using the toothpicks? Record those as well.

EVENT 5: Using 8 toothpicks, make as many different figures as you can. Record each by either gluing them down or drawing them on paper. If you know their names, write them next to each figure.

SESSION
TWO

Number
Concepts
and
Problem Solving

Math Olympics 2000/2002 - Session 2
Topic: Number Concepts and Problem Solving

Warm Ups

- Nametags
- Estimation Jar
- The "20" Triathlon
- Spinner Sprints - Odd and Even
- A Pair of Numbers

Welcome Back

- Welcome
- Share homework results from participants

Activities

- Olympic Number Mysteries
- Digit Decathlon
- Digit Boxing
- Nim Competitions
  - Concrete Event
  - Mental Math Event
- Hundred Chart Hockey

Homework

- Hundred Chart Hockey Challenge
- Money Marathon
- Number Search
- Nim Competitions
- Number Archery
- Spinner Sprints

Closure

- Review of warm ups, hand out prize(s) for estimation jar
- Incentives to return
- Hand out and review packet for home

Math Olympics 2000/2002 - Session 2
Topic: Number Concepts and Problem Solving (Primary Grades)

Description of Activities and Preparation for Session Events

Set Up of Room

The room in which you hold Math Olympics 2000/2002 should be large: the cafeteria, the media center or library, or an open area. You will need tables centered before an overhead projector for participants to sit at during the main activities of the sessions. You will also need tables around the outskirts of the room for the Warm Up activities at the beginning of the evening. You will want a table for the Nametags near the door. You may also want a refreshment table if you plan to break halfway through the night for refreshments.

You may want to place baskets or boxes on each table that hold the materials needed for the main activities of the evening. Think about how best to organize your materials to eliminate "down-time" while waiting to dispense supplies.

Warm Ups

(The Warm Ups should go more quickly tonight as participants get used to the routine.)

Nametags

Set up the Nametag Table with individual nametags so that every participant (leaders, children, and adults) has his or her name visible for others to see.

Display the sign for the Nametag Table that encourages people to sign. Make a Sign-In Sheet, if desired, to keep track of who attends.

As the children and adults arrive, have one leader greet them and point them toward the Nametag Table. Have colored markers available for the participants to write their names on the nametags.

After they sign in, encourage families to move to the other centers to begin exploring the warm-up activities.

Estimation Jar

Each week fill the estimation jar (a quart mayonnaise jar or larger) with one kind of item (small dog biscuits, superballs, jar breakers, Hershey Kisses, etc.) Count the items prior to the night of the event, write the number of items in the jar on a piece of paper and tape it to the inside of the lid of the jar.

Display the sign for the "Estimation Jar" at a warm-up center.

Encourage participants are to record their estimates of how many of the item chosen for that week are in the jar.

Place pencils and pieces of paper near the jar on which participants can write their estimates and name. Place a basket near the jar in which participants can place their estimates.

The "20" Triathlon

In this Warm Up, the participants are challenged to represent "20" in as many ways as possible: with pictures, numbers, and words. They might use tally marks, draw ten fingers and ten toes, write number sentences (5 + 15 = 20), draw money, draw two nickels and one dime, etc. The possibilities are endless. Provide paper, crayons, and markers for their use. Each pair of participants should create a page that shows "20" in many ways. Have them hang it on the "20" bulletin board display near the table.

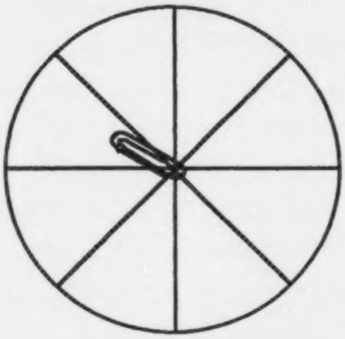
Before Session Two, set up a display board, bulletin board, or chalkboard area for the participants to display their work. You might want to have one sheet of ideas already hanging on the board to stimulate their thinking. Gather the paper, crayons, and markers needed for this activity. Provide chairs and a table on which they can work.

Spinner Sprints

At this center supply odd and even spinners for each pair, a paper clip and a pencil for each person, some markers, and a piece of chart paper to record the results.
Make a sign that says, "Spinner Sprints - Odd and Even." Display the directions which are included in the Support Section for Session Two.

Station a leader nearby to demonstrate how to use the paper clip and the pencil as the spinner:

Place a spinner on the table. Place the paper clip so that one of its curved ends encompasses the center point of the spinner. Hold the pencil in your hand and place the point of the pencil on the center point of the spinner to keep the paperclip centered as it spins . Use your free hand to spin the paperclip so that it encircles the spinner several times and then stops on a number.



Children and adults will compete against each other spinning numbers and trying to reach the largest total in 10 spins each. Children use the even spinner, adults the odd. Provide counters or beans for the children's use if needed to help them compute their sums.

Make a "Spinner Sprints - Odd and Even" results chart on which the pairs can record the results. At the end of the evening discuss with the participants whether it made any difference if the spinner used was odd or even. Did even win more often than odd? Odd more often than even? Was it a fair game?

Who Won – Odd or Even?	
Kids-Even	**Parents-Odd**

A Pair of Numbers

Prior to the evening, make an overhead transparency of each of the "My two numbers…" sheets and place them at the center with the directions for "A Pair of Numbers." If you prefer, make each page a large display on chart paper.

Provide overhead pens or pencils, crayons, or markers for use by the participants.

Participants will record pairs of numbers that fit the clues found on each transparency or chart.

Share the results at the end of the evening. Did we find all the solutions for each? Is that possible? How do we know?

Welcome Back

Welcome Back and Homework Check

Gather your participants to the tables centered in front of the overhead projector. Welcome them back with "Olympic" enthusiasm and reintroduce all leaders involved in the program.

Ask if any participants completed the homework from the prior week. Allow time to share their efforts and results.

Explain that the focus of this session is Number Concepts and Problem Solving. Share the fact that rather than ONLY teaching rote computation in mathematics classes, today we use a 'number sense' approach in instruction. We help students see the relationship of numbers, what happens when we combine them, or take them apart. We also help them APPLY those skills in problem-solving situations so that they actually get to USE what they have learned in a real life way. Ask the participants to look for all the "problem-solving" situations we experience tonight. Ask them to also look for the computation needed in those settings. Ask them how number sense was involved in the centers we just completed.

Activities

Olympic Number Mysteries

This activity focuses on the characteristics of numbers and number sense. Prior to the session, write either two- or three-digit numbers on index cards (one number per card). The number of digits is determined by the level of the students in your group. Explain that each participant will have a mystery number taped to their back. They may not look at it. Their job is to move around the room asking other participants "yes" and "no" questions about their number until they figure out what it is. The questions must be worded so that you can answer either "yes" or "no." Here are some examples:

- Is it an odd number?
- Is it between 300 and 500?
- Will I say it if I skip-count by 5?

Have a participant write a number on a card and place it on your back. Model the activity by asking the group "yes" and "no" questions to figure out your number.

Tape cards to the back of each participant. Make sure every number is different. Display a transparency of the directions for "Olympic Number Mysteries" on the project for participants to refer to during the game. Allow time for participants to play the game and figure out what their number is.

When finished have the participants get in a number line to check their numbers. Ask, "Who thinks they have the lowest number? What do you think your number is? Does anyone think they have a lower number?" and so on until the participants are in the places they think they belong. Then have them take off their numbers, check to see if they were correct, and check their number line. Is it in order?

Digit Decathlon

Prior to the evening, prepare bags of number cards for your participants. Prepare a student bag and an adult bag for each pair. The student bag should contain 10 numbers between 0 and 50. For example, it might contain 7, 13, 29, 30, 36, 37, 41, 48, 49. Mix the cards up so they are not in order. The adult bag should contain numbers between 1000 and 5000. Mix them, as well, so they are not in order. Provide a stopwatch or wall clock with a second-hand for timing this event.

Make a Decathlon Times Chart prior to the event on which participants will record their times. You could have them just list their time, put their name on a number timeline, or fill in a graph to display their time.

Use construction paper to make gold, silver, and bronze medals for the first, second, and third place winners in both the student and adult categories. Display the game directions on the overhead. Participants will time each other trying to be the fastest to put their cards in order. Allow time for the game to be played and participants to record their results. Award the medals to both student and adult winners at the end of the game.

Digit Card Boxing

For this activity, you need to make a set of digit cards for each pair of participants. For each pair, you need 10 index cards. Cut the cards in half.

This will give you 20 cards for each pair. In large lettering and in marker or crayon, write one of the digits 0 to 9 on each card so that when you finish you have two "0" cards, two "1" cards, two "2" cards and so on (two of each digit from 0 to 9). Place the set in a plastic bag.

Round One - Can You Change Your Number to Mine?

Ask the pairs to use their digit cards to make any three-digit number (_ _ _) that they want.

Once every pair has a number displayed before them on the table. Tell them that you have a special number in your head. Their job is to see if they can use the clues you share to change their number to yours. They may use ANY of the digit cards in their set (the ones on the table or the ones left over unused). With each clue they may change the digits in their number to match your number. You may repeat the clues as often as needed.

Example of what you might say:
Clue 1: The digit in the ones place is odd. It is greater than 1 and less than 5. Change your number to match mine. (_ _ 3)

Clue 2: If I add the digit in the ones place to itself, I get the digit in the hundreds place. (6 _ 3)

Clue 3: If I subtract two from the digit in the hundreds place, I get the digit in the tens place. (6 4 3)
Does anybody know my number?

NOTE: The clues do not have to be interconnected as these were. They can use separate clues not related to the previous digit given.

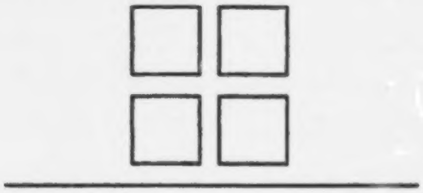
Repeat the game with a different number. Then have the pairs play against each other. This game allows children and adults to think about numbers differently than they usually do. They begin looking at the characteristics of numbers and how they relate. It is also a great way to reinforce place value. Notice that I did not go in order from ones to tens when giving the clues. The listener had to think about the place being named and move there.

Round Two - Boxing for the BEST Solution!!

-- Ask the participants to take out the following digit cards:

8 3 2 5 6 4

Then ask them to select four of the seven digits above to make a two-digit plus two-digit addition problem that will give them the GREATEST sum possible



Allow time for the pairs to work together. Have participants share their solutions and how they arrived at their answer.

-- Now ask the group to use the same six cards again but this time make a 2-digit plus 2-digit addition problem whose sum is between 70 and 90.
Allow time for them to work. Share all solutions found. Pose the question: I wonder how many solutions there are in all using these seven number? (Don't take the time to find them now but discuss how practicing computation can be a lot more fun with digit cards and some problem solving than with a regular worksheet.)

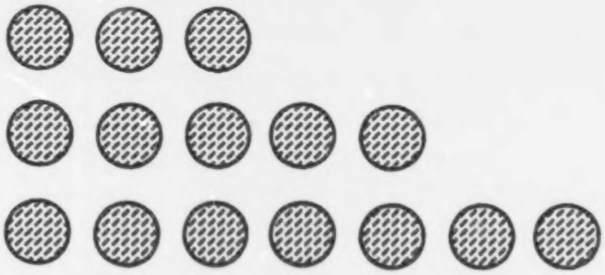
Variations - are countless!!
-- Change the operation to multiplication or division.
-- Change the number of digits used.
-- Change the goal (lowest number, even number, number between...., as many solutions as possible)

Nim Competitions

Concrete Nim - Gather sets of buttons, coins, blocks, beans, or whatever materials you wish to use. Make sure each bag contains 15 of the same item. Give each pair a bag. Review the rules of the game using the overhead of the directions.

Rules of the Game:

- Arrange the counters in three rows (3 counters in the first row, 5 in the second, and 7 in the third.



- Take turns removing as many as you want but only from one row. You can take an entire row if you want.

- No skipping turns!!!

- The winner forces the other person to take the last one.

Once they have played it several times, have them try some variations:

- change the number of rows
- change the number of counters
- does the strategy you use change if there is an even number instead of an odd number of counters?
- what if there is only one row?

Mental Math Nim - Participants need paper and pencil.
The goal is to be the player that gets to 23.

Rules of the Game:

- Players decide who will go first.
- The first player picks either 1, 2 or 3 as his or her starting number.
- Player Two add either 1, 2, or 3 to the first players number.

- Players take turns repeating this process each time adding the new number to the total so far.
- The player that reaches 23 first wins.

Have pairs play several times. Discuss the strategies they used that helped them win.

Variations - and they are countless
- change the goal
- subtract instead of adding
- one player uses odd numbers, the other even
- multi-step turns (subtract and multiply - +3 x 2)

Hundred Chart Hockey

Distribute a Hundred Chart to each participant or each pair, depending on your preference. Place an overhead transparency of the "Hundred Chart Hockey" clue sheet on the overhead projector. Share each clue one-at-a time allowing time for the participants to process them and narrow down the possible choices. Once all the clues have been given, allow time for them to check back through them to make sure their answers are correct. (Answer: 28)

Homework

Hundred Chart Hockey Challenge

Share the overhead of the "Hundred Chart Hockey Challenge." Explain that during the week they should create six clues to help the rest of us find their mystery number on the hundred chart. Ask them to bring their clues to the session next week so that they can share them either with the whole group or with other pairs of participants (however you would like to do it).

Money Marathon

Practice with money can also be done in a problem-solving setting. Explain that in Money Marathon, students and adults should work with real coins to try to find the solutions. Encourage the adults to make up other money problems similar to these to give students experience with counting change.

Number Search

Using the "Number Search" sheet in the Home Packet, ask the participants to look for at least 20 different examples of numbers that they use in their home. Ask them to bring this list back to share with the group.

Nim Competitions

The Nim activities from tonight's session are included for use during the week.

Number Archery

Number Archery is another number-sense game in which you work together to find different solutions that fit the clue. For example, if the target is 8, and the clue is "add two different numbers," the solutions could be:

4 + 4   1 + 7   3 + 5   2 + 6 and so on.

Explain that there is one "Number Archery" sheet with a target of 9. The second sheet is blank so that the participants can choose their own target.

Spinner Sprints

The Spinner Sprint activities from tonight's session are included for use during the week.

Closure

Review each of the warm ups.

The "20" Triathlon: Share and discuss the variety of ways that participants represented 20. Talk about other possibilities not included, if appropriate.

Spinner Sprints: Review the results of the games. Did students win more than adults? Adults more than students? Was it a fair game? Why or why not? Would they change the game if they could? How? Would it be a fair game then?

A Pair of Numbers: Share the solutions participants recorded on the overhead transparencies or chart paper. Discuss other possible solutions. Some will have a certain number of possibilities while others might be endless.

Estimation Jar: (During the evening have one leader sort through the estimation responses and select the best one or two estimates.) Talk about strategies the participants used to arrive at their estimates. Announce the winner(s) of the Estimation Jar contest and give them a prize (I Love Math button, math pencil, etc.) Remind participants that the Estimation Jar will be a part of each session during the Math Olympics 2000/2002.

Incentives to Return: Ask if the participants have enjoyed the evening. Talk about some of the topics you will explore in the next week or two. Encourage them to return for more fun next week.

Distribute Packets: Distribute the packets to each student/adult pair reminding them that the homework assignment and the hundred chart that they need for the homework are included in the packet. Explain that some of the activities that they experienced tonight are also in the packet so they can revisit them during the week. In addition, there are several new activities for them to explore. Review the contents and answer any questions they may have.

Packet Contents:

Hundred Chart Hockey Challenge
Hundred Chart
Money Marathon
Number Search
Concrete Nim
Mental Math Nim
Number Archery (two sheets)
Spinner Sprints
Odd and Even Spinners

THINGS TO DO BEFORE SESSION TWO

Supplies to Gather or Purchase

- nametags
- colored markers
- crayons
- pencils
- baskets for collecting estimates and surveys
- estimation jar
- contents for estimation jar
- sticky notes
- small pieces of paper for estimation responses
- blank paper
- masking tape
- index cards
- stopwatches or clock with second hand
- construction paper for gold, silver, and bronze medals
- paperclips
- chart paper
- clear counters, beans, counters, cubes, or buttons for use with hundred chart
- prizes for estimation awards

Things to Make

- Signs for centers (Estimation, Nametags, The "20" Triathlon, Spinner Sprints - Odd or Even, A Pair of Numbers)
- Fill Estimation Jar
- Copy of The "20" Triathlon directions to display at the center
- Display Board or Bulletin Board for the "20" Triathlon
- Copy of the Spinner Sprints directions to display at the center "Spinner Sprint - Odd or Even"
- Copy of Results Chart for the Spinner Sprints
- Copy of directions for A Pair of Numbers – select the copy that lists transparencies if you are using transparencies OR chart paper if you are using chart paper
- Chart paper replicas of the "My Two Number" clue sheets if you don't use overhead transparencies
- Write two- or three-digit numbers in colored marker on index cards for use in Olympic Number Mysteries activity

Things to Make (continued)

Make student bags of 10 numbers between 0 and 50 for all student participants to be used in Digit Decathlon. All student bags should contain the same ten numbers.

Make adult bags of 10 numbers between 1000 and 5000 for all adult participants to be used in Digit Decathlon. All adult bags should contain the same ten numbers.

Make a Decathlon Times Chart to record adult and student times in Digit Decathlon.

Use construction paper to make gold, silver, and bronze medals for first, second, and third place winners in both student and adult Digit Decathlon.

Sets of digit cards for each pair – see directions in "Prep" pages just prior to this document.

Put 15 counters (buttons, beans, cubes or whatever) in bags for Nim game.

Papers to be copied for use DURING Session 2

Directions for the "20" Triathlon to be hung at center
Directions for "Spinner Sprints" to be hung at center
Spinner Sprints Odd & Even Spinners- at least one per pair
Hundred Charts – several per pair

Overhead Transparencies to Make for use DURING Session 2

One copy of each of the My Two Numbers sheets....(five different clue sheets) for participants to write on in A Pair of Numbers
Olympic Number Mysteries to display when explaining directions
Digit Decathlon to display when explaining directions
Concrete Nim Game Rules
Mental Math Nim Game Rules
Hundred Chart Hockey Clue Sheet
Hundred Chart
Hundred Chart Hockey Challenge
Money Marathon
Number Search
Number Archery

Packet Contents to be copied for use at Home

Title Page
Hundred Chart Hockey Challenge

Packet Contents to be copied for use at Home (continued)

- Hundred Chart
- Money Marathon
- Number Search
- Concrete Nim
- Mental Math Nim
- Number Archery (two sheets)
- Spinner Sprints
- Odd and Even Spinners

Session Two

- √ Support Materials
- √ Masters of activities sheets
- √ Masters of Overhead Transparencies
- √ Master of Home Packet

THE "20" TRIATHLON

What are all the ways we can SHOW

"20?"

Use crayons, markers, or pencils to show "20" in pictures, numbers, and words.

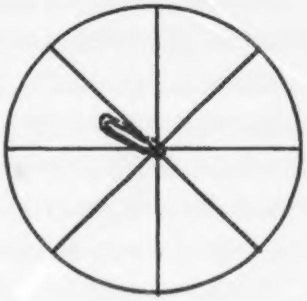
How many ways can you find?

*Hang your work on the **"20"** board for others to see.*

SPINNER SPRINTS
Odd and Even!!

In this event, STUDENTS take on their ADULT PARTNER in an all-out ODD and EVEN competition

Students use an EVEN spinner, a paperclip, and a pencil. Adults use an ODD spinner, a paperclip, and a pencil.



To Spin:

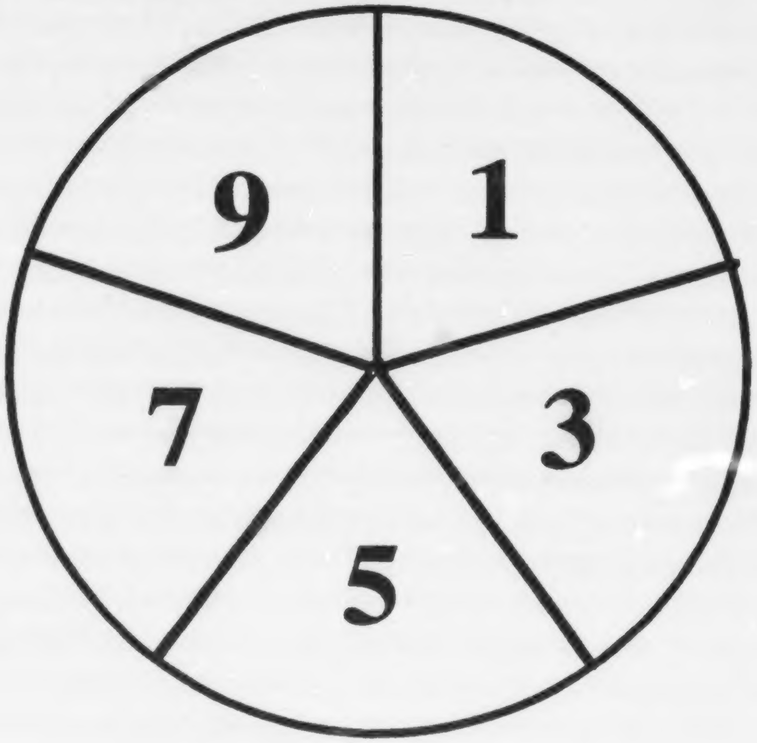
- *Put the paperclip in the center of the spinner.*
- *Place the pencil tip at the very center of the spinner to hold the paperclip in position.*
- *Spin the paperclip.*

To Play:

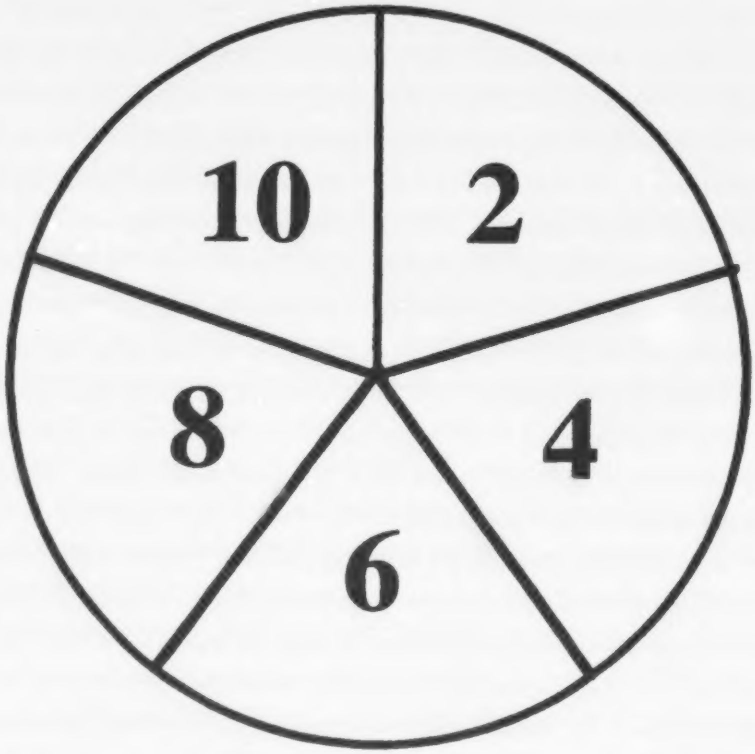
- *Each player takes turns spinning the spinner ten times.*
- *Add the numbers you spin to get a total.*
- *The winner is the player with the largest sum.*
- *Put a tally on the chart to show who won.*

SPINNER SPRINTS

Odd Spinner



Even Spinner



A PAIR OF NUMBERS?!?!?!

On each of the overhead transparencies (My Two Numbers) on this table there is a different clue about a pair of numbers. List at least two different pairs of numbers that you and your partner can think of that fit the clue. Don't list pairs of numbers that someone else has already written. Thinks of other pairs of numbers that would work as well.

How many can we find?

Example: My two numbers are both odd.

1 and 3
9 and 15
19 and 11
45 and 55
7 and 41
25 and 71
21 and 23
67 and 69

My two numbers are both even!!

How many pairs can we find?

The sum of my two numbers is 20!!

How many pairs can we find?

My two numbers
are three apart!!

How many pairs can we find?

Both of my numbers have a 7 in them.

How many pairs can we find?

My two numbers are Between 12 and 62!

How many pairs can we find?

OLYMPIC NUMBER MYSTERIES

Each participant has an unknown number taped to his or her back. The object of the game is for each person to find out what that number is WITHOUT looking at it or just being told.

Rules of the game:

- You may only ask 'yes' and 'no' questions to other participants.

(Is my number even? Is it between 10 & 20?)

- You may only ask one question to each person at a time.
- How many of us can figure out our numbers? Can we all?

GOOD LUCK!!

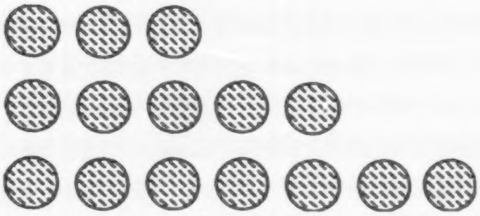
DIGIT DECATHLON

In this competition, you want to be the fastest to put the number cards in order from the least to the greatest. How many seconds will it take you? Can you do it faster than your partner? Can you do it faster than anyone here tonight? Can you earn a medal in the DIGIT DECATHLON?

DIRECTIONS:

- Take the cards out the bag and hold them in your hand.
- Give your partner the stopwatch and make sure it is at 'zero' and ready to be used to time you.
- Your partner will say, "Ready, set, go!" and push the start button on the stopwatch.
- You put the cards on the table in order as fast as possible.
- When you put down the last card, you yell "STOP!" and your partner will push the button to stop the watch.
- Record your time on the Decathlon Times chart.
- The first, second, and third fastest times will get medals
    - Gold medal for first place
    - Silver medal for second place
    - Bronze medal for third place

Good Luck!!!



Concrete Nim

Rules of the Game

- Arrange the counters in three rows (3 counters in the first row, 5 in the second, and 7 in the third).

- Take turns removing as many as you want but only from one row. You can take an entire row if you want.

- No skipping turns!!!

- The winner forces the other person to take the last counter.

Game Variations:
- Change the number of rows
- Change the number of counters
- Does the strategy you use change if there is an even number instead of an odd number of counters?
- What if there is only one row?

Mental Math Nim

Participants need paper and pencil.
The goal is to be the player that gets to 23.

Rules of the Game:

- Players decide who will go first.
- The first player picks either 1, 2 or 3 as his or her starting number.
- Player Two adds either 1, 2, or 3 to the first players number.
- Players take turns repeating this process each time adding the new number to the total so far.
- The player that reaches 23 first wins.

- Variations - and they are countless
- change the goal
- subtract instead of adding
- one player uses odd numbers, the other even
- multi-step turns (subtract and multiply - +3 x 2)

1 - - 2 - - OR - - 3??

Hundred Chart Hockey

Use your Hundred Chart and the following clues to find my secret number:

- My number is less than 50.
- If I skipcount by 7, I land on my number.
- My number is not odd.
- The sum of the digits of my number is 10.
- If I skipcount by 4, I land on my number.

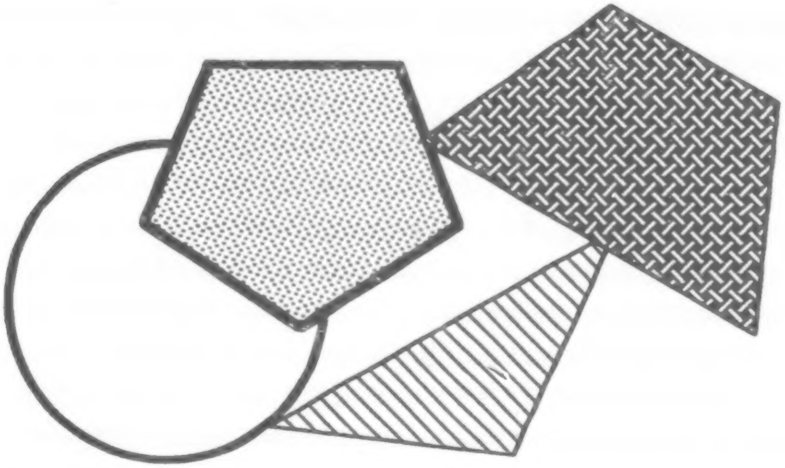
Do you know what my number is?

HUNDRED CHART

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

MATH
OLYMPICS
2000/2002

Primary Mathematics Fun
for Communities of Children and Adults
to Share at Home



Week Two

Hundred Chart Hockey Challenge

Score a goal for your team by creating a problem for others to solve!!

Select one number on the hundreds chart as your **MYSTERY NUMBER**. Write SIX (6) clues about the number so that anyone reading the clues could figure out what the number is.

Use clues such as:

The sum of the digits is....
It is an odd (or even) number
If I skipcount by ____, I land on my number.
If I add the digits, I get....
It's in the middle (top half, bottom half) of the hundred chart.
It is greater than (less than)....
If I subtract the digits, I get.....

Write your clues neatly and clearly. Be ready to share them when we get together next week. Check your clues to make sure they are accurate and lead to only one number. Have fun!!!

HUNDRED CHART

1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

Money Marathon

Kara and Sam volunteered to help at the Olympics in Sydney, Australia. They knew that it would take a lot of money to make the event a success so they saved their snack money to contribute to the effort.

See if you can figure out how much each child contributed on the first day of school.

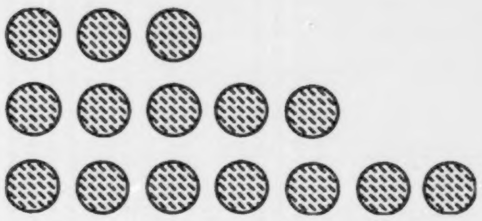
Kara gave the following:
- *20¢ in dimes.*
- *one quarter.*
- *4 nickels.*
- *the same number of pennies as nickels.*

Sam gave the following:
- *a total of 11 coins.*
- *pennies, nickels, and dimes*
- *three dimes*
- *the same number of nickels and pennies.*

NUMBER SEARCH

Numbers are everywhere!! We use them all the time for lots of different things. We use them when we shop, play, work, and rest.

Find as many different numbers or uses for numbers around your home as you can. Make a chart below to record all the numbers or number uses that you find.



Concrete Nim

Rules of the Game

- Arrange the counters in three rows (3 counters in the first row, 5 in the second, and 7 in the third).
- Take turns removing as many as you want but only from one row. You can take an entire row if you want.
- No skipping turns!!!
- The winner forces the other person to take the last counter.

Game Variations:

- Change the number of rows
- Change the number of counters
- Does the strategy you use change if there is an even number instead of an odd number of counters?
- What if there is only one row?

Mental Math Nim

Participants need paper and pencil.
The goal is to be the player that gets to 23.

Rules of the Game:

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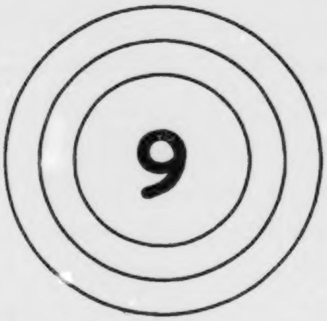
- Variations - and they are countless
- change the goal
- subtract instead of adding
- one player uses odd numbers, the other even
- multi-step turns (subtract and multiply - +3 x 2)

1 - - 2 - - OR - - 3??

Number Archery



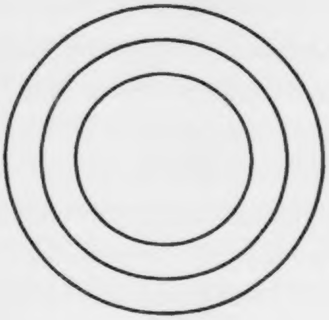
Can you hit the bull's eye?

Nine is the target. Use your good number sense to hit it each time! Hit the target by:

- *adding two different numbers.*
- *adding three numbers.*
- *adding and subtracting.*
- *subtracting two numbers.*
- *starting with a number greater than 10.*
- *starting with a two-digit number other than 10.*
- *starting with 100.*
- *making up a really hard problem.*

Pick a different target and try again!

Number Archery



Can you hit the bull's eye?

The number in the bull's eye is the target. Use your good number sense to hit it each time! Hit the target by:

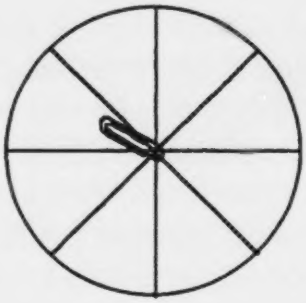
- *adding two different numbers.*
- *adding three numbers.*
- *adding and subtracting.*
- *subtracting two numbers.*
- *starting with a number greater than 10.*
- *starting with a two-digit number other than 10.*
- *starting with 100.*
- *making up a really hard problem.*

Pick a different target and try again!

SPINNER SPRINTS
Odd and Even!!

In this event, STUDENTS take on their ADULT PARTNER in an all-out ODD and EVEN competition

Students use an EVEN spinner, a paperclip, and a pencil. Adults use an ODD spinner, a paperclip, and a pencil.



To Spin:

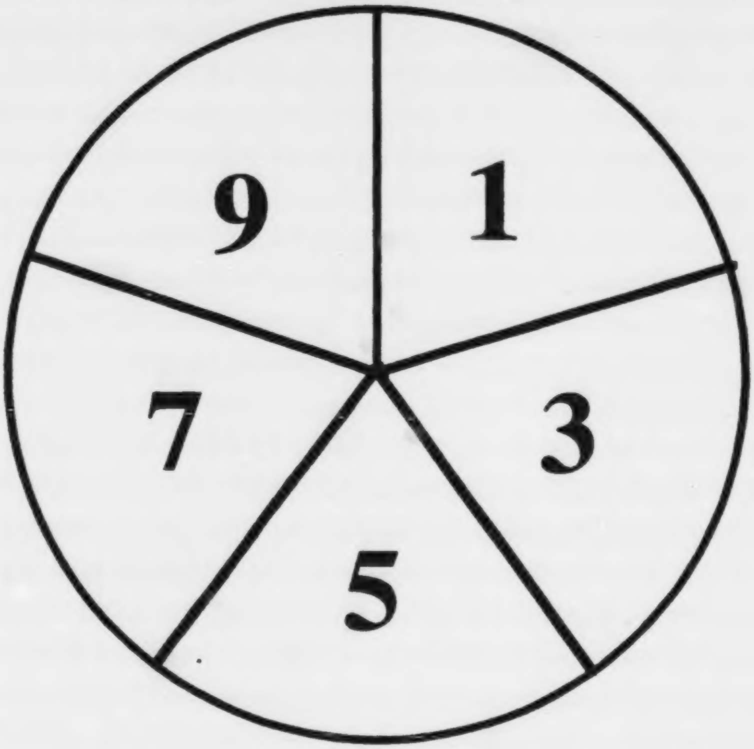
- *Put the paperclip in the center of the spinner.*
- *Place the pencil tip at the very center of the spinner to hold the paperclip in position.*
- *Spin the paperclip.*

To Play:

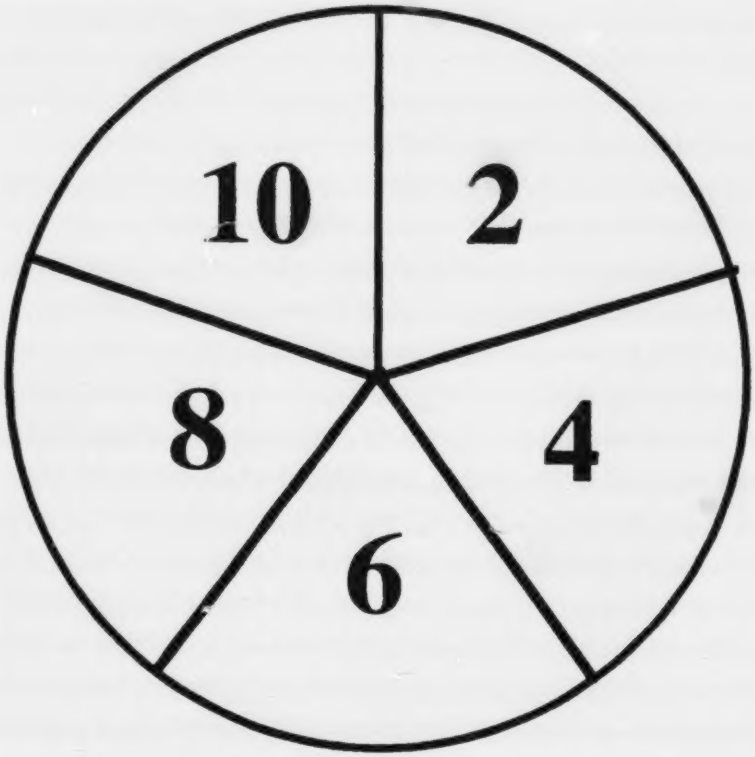
- *Each player takes turns spinning the spinner ten times.*
- *Add the numbers you spin to get a total.*
- *The winner is the player with the largest sum.*
- *Put a tally on the chart to show who won.*

SPINNER SPRINTS

Odd Spinner



Even Spinner



SESSION THREE

Estimation and Calculators

Math Olympics 2000/2002 - Session 3
Topic: Estimation and Calculators

Warm Ups

Nametags
Estimation Jar
Newspaper Archery
Namesake Weightlifting
Handful Handball
Broad Jump Battle

Welcome Back

Welcome
Share homework results from participants

Activities

Ten Ways You Use Arithmetic
Minute Marathon
Constant Key Dashes
Subtraction Dash
Calculator Nim Kayaking
Dice Dressage/Spinner Sailing
Calculator Cycling
Best Guess

Homework

Estimate and Verify
Addition Dash and Subtraction Dash
Bull's-Eye
Calculator Nim Kayaking
Calculator Cycling

Closure

Review of warm ups, hand out prize(s) for estimation jar
Incentives to return
Hand out and review packet for home

Math Olympics 2000/2002 - Session 3
Topic: Number Concepts and Problem Solving
(Intermediate Grades)

Description of Activities and Preparation for Session Events

Set Up of Room

The room in which you hold Math Olympics 2000/2002 should be large: the cafeteria, the media center or library, or an open area. You will need tables centered before an overhead projector for participants to sit at during the main activities of the sessions. You will also need tables around the outskirts of the room for the Warm Up activities at the beginning of the evening. You will want a table for the Nametags near the door. You may also want a refreshment table if you plan to break halfway through the night for refreshments.

You may want to place baskets or boxes on each table that hold the materials needed for the main activities of the evening. Think about how best to organize your materials to eliminate "down-time" while waiting to dispense supplies.

Warm Ups

(The Warm Ups should go very well tonight
since participants are used to the routine.)

Nametags

Set up the Nametag Table with individual nametags so that everyone participating (leaders, children, and parents) has his or her name visible for others to see.

Display the sign for the Nametag Table that encourages people to sign. Make a Sign-In Sheet, if desired, to keep track of who attends.

As the parents and children arrive, have one leader greet them and point them toward the Nametag Table. Have colored markers available for the participants to write their names on the nametags.

After they sign in, encourage families to move to the other centers to begin exploring the warm-up activities.

Estimation Jar

Each week fill the estimation jar (a quart mayonnaise jar or larger) with one kind of item (small dog biscuits, superballs, jar breakers, Hershey Kisses, etc.) Count the items prior to the night of the event, write the number of items in the jar on a piece of paper and tape it to the inside of the lid of the jar.

Display the sign for the "Estimation Jar" at a warm-up center.

Encourage participants are to record their estimates of how many of the item chosen for that week are in the jar.

Place pencils and pieces of paper near the jar on which participants can write their estimates and name. Place a basket near the jar in which participants can place their estimates.

Newspaper Archery

In this warm-up, participants search through a section of the newspaper to find different types of numbers. They record their finds on the Newspaper Archery sheet. You can offer a prize for the most finds if you like. Or you can make a large set of bull's-eyes similar to the worksheet and have everyone record their finds on that, making it a joint effort.

Namesake Weightlifting

Prior to the evening use bulletin board paper to make a graph on which the participants will place their bar. Provide grid paper to make the graph. Masters of centimeter paper and two-centimeter grid paper are included in your support materials. Provide calculators for those who may need them. In this activity, each participant finds the value of their name (first and last names together) to determine how much weight they can lift. They will use grid paper to make a bar for the group graph that displays their name value. The person with the most valuable name (the longest bar on the graph) is the Weightlifting Champ!! When reviewing the warm-ups at the end of the evening, spend some time comparing the data on the graph.

- Where most names about the same in value?
- What number occurred the most?

- What number was in the middle?
- Were the adult names usually more valuable than the student names?
- What else did you notice?

Handful Handball

Prior to this Session 3, make a chart on which the participants can record their results.

This is a HANDFUL!!!!					
0-10	11-20	21-30	31-40	41-50	51 & Up

In this warm-up, the participants estimate how many beans (or whatever fills each plate) they will be able to pick up in one handful. You will need four paper plates and four different sets of items, one set for each plate.

Before they actually pick up the items, the participants write their name, the name of item to be picked up, and estimate of how many they think they will pick up on a sticky note. Provide one color of sticky notes for the students to use and another color for the adults. After they pick up a handful and count how many they actually have in their hand, they write that amount on the sticky note and draw a circle around it. Then they place the note on the chart in the appropriate column.

It is important to have two similar items of different sizes so that the participants can use their experience with the first to help them better estimate with the second. For example, if you use lima beans on the first plate. When they go to the plate of pinto beans, they will see that the pinto bean is about half the size of the lima bean, so they should be able to pick up twice as many. In your discussion afterwards, make sure to talk about how we use one experience in estimation to help us be more accurate in future efforts (kind of like learning as you go). Also look for patterns in the data on the chart and discuss why these might occur. Since you used one color sticky note for adults and one for students, you can even compare the results to see if adults consistently pick up about twice as much.

Broad Jump Battle

Provide an area of the room that participants can use for a broad jump activity. Use masking tape to mark the jump line. Run another length of masking tape down the side with the distances marked off. Or provide meter tapes for participants to use to measure their jumps.

Each participant should estimate how far he or she will jump and record it on the Score Sheet. Each person gets three jumps to try to jump the farthest possible. Each time the participant can adjust his or her estimate.

Each person gets a point if his or her estimate is within five centimeters of the actual jump.

Welcome Back

Welcome Back and Homework Check

Gather your participants to the tables centered in front of the overhead projector. Welcome them back with "Olympic" enthusiasm and reintroduce all leaders involved in the program.

Ask if any of the participants brought back Hundred Chart Hockey Challenges for us to try. If so allow time for them to share them and the group to solve them. Make sure you have Hundred Charts for their use and an overhead transparency of it as well. Many of the participants have brought Challenges, break them into small groups so that all can be shared in a short amount of time.

Discuss any other homework returned by the group members.

Explain that the focus of this session is Estimation and Calculators. Tonight we will be doing activities that model for us how useful estimation is in everyday life. We will also experience activities that help us see the usefulness of calculators in mathematics instruction. Mathematics is filled with patterns. The student that is able to see those patterns can use them to build their mathematical understanding. Calculators provide an opportunity to see patterns in abstract numbers in a very visual way. Thus, this is a tool that can reap great learning, if used correctly.

Activities

Ten Ways You Use Arithmetic

This activity will help participants see not only how much arithmetic is used each day but that we rarely use it in the way that we usually do in school (paper and pencil). More often we apply mental math or calculators to our efforts in everyday life.

Ask the participants to make a list on paper of ten ways that they use ARITHMETIC in their everyday lives. Allow time for them to do this. Then record their responses on the overhead projector, a chart, or a chalkboard.

Next use three different colored markers. With the group's help color-code each response to show which of the following methods they most use most in everyday life:

red - mental math
blue - calculator
green - paper and pencil

Next draw a circle around every item in which you would most often use an estimate rather than an exact amount (for example, when figuring the tip at a restaurant).

Have the group draw some conclusions from the coding you have done together. Most likely your efforts will show that:

Most often we use mental math and estimation in our everyday lives.
The second method we use is the calculator.
Paper and pencil are used least often. Yet that is what we spend a great deal of time on in math class.
Exact answers are not needed as often

Minute Marathon

In this estimation activity, the participants will be estimating time and how much they can do in a specific amount of time.

Lap One - How Long is a Minute?

Ask the participants if they know how long a minute is. Get some responses. Then ask them to close their eyes. Tell them that when you give the signal, they should sit very still. When they think a minute is up, they should keep the eyes shut and raise a hand. As this occurs take note of the people whose hands go up early and those who don't respond at all. When a minute is up say, "Stop. A minute is up. Open your eyes."

Discuss with the group how the minute felt (long, short). Ask what they did to try to figure out how long it was (some might have counted 1000, 1001, etc.).

Lap Two - How Many in a Minute?

Ask each participant to choose an activity to do repeatedly during a minute. Some might want to do jumping jacks, push-ups, hand-claps, snap their fingers, or say their name over and over again.

Ask them to write down on a piece of paper their estimate of how many they will be able to do. Distribute stopwatches, if available.

Ask your participants to work in teams of four people to test their estimates. Ask them to rotate the jobs of timer, counter, starter, and contestant until all four have had an opportunity to do each. Ask that each member write down the actual count on his or her paper and circle it. It is the starters additional job to make sure the contestant doesn't slow down during his event just to hit his or her estimate.

Discuss their reactions to the length of a minute in this activity. Was it hard to live up to the estimate?

Constant Key Dashes

Dash to 100

Distribute calculators to every participant. Model how to use the constant key to show repeated addition, subtraction, multiplication, and/or division.

NOTE: On many calculators, you hit the operation key (+), then the number key (4), then hit the equal key (=) repeatedly to skip count.

[+ 4 === should give you 12 on the display]
[+4 ========== should give you 40]

To subtract using the constant key, put in the number you want to start with (100). Hit the operation key (-). Press the number key (10). Then hit the equal sign(=) repeatedly to reach your goal.

[100 - 10 = = = = = should give you 50]

Ask the participants to pick a number between 1 and 15. Instruct them to tell the number to their partner. Then have them predict how many times they would have to hit the constant key on the calculator to get to or pass 100. Based on their estimate, have them predict who will win the race, them or their partner.

Next have the partners clear their calculators and get ready to race to 100 using the constant key system and the number they picked.

Subtraction Dash

Distribute a 0-9 spinner and a paperclip to each pair of participants. Display an overhead transparency of the "Subtraction Dash" rules. Review them with the group. Then allow time for the partners to play it a couple of times.

Let the participants know that two Dash games will be in their packet for use at home.

Calculator Nim Kayaking

Remind the participants that they played Nim games last week. Explain that this week we have some Nim games that use the calculator. Display the overhead transparency of "Calculator Nim Kayaking" and review the rules for one of the games. Allow time for players to try one or two of the games. Let the participants know that a copy of this sheet will be in their packet for use at home.

Dice Dressage/Spinner Sailing

You can use number cubes (dice) for this activity or spinners depending your community's reaction to dice in the classroom or their availability. The spinners work just as well as the "number generators."

Ask the participants to predict which sum they would get most often if they were given two dice to roll or a 1-6 spinner to spin twice. Have them write their prediction down on a piece of paper and put it aside.

Give the pairs two dice (or a 1-6 spinner and a paperclip) and the tally sheet entitled either "Dice Dressage" or "Spinner Sailing" depending on which you are using.

Instruct them to roll the dice and add (or spin the spinner twice and add). Then record their sum on the sheet using tally marks. Have them repeat this twenty times.

Then ask them to revisit their prediction. Was it accurate? Would they change it? Which sum came up most often for each pair. Combine the data of all the groups to see if one sum stands out consistently.

Discuss why one sum should come up most often (There are more combinations to make a sum of 7 than any other possible sum.
Build the following chart that following with the group to demonstrate this fact:

Possible Combinations for Each Sum

					6+1					
				5+1	5+2	6+2				
			4+1	4+2	4+3	5+3	6+3			
		3+1	3+2	3+3	3+4	4+4	5+4	6+4		
	2+1	2+2	2+3	2+4	2+5	3+5	4+5	5+5	6+5	
1+1	1+2	1+3	1+4	1+5	1+6	2+6	3+6	4+6	5+6	6+6
2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**

Discuss the fact that there are six possible combinations for the sum of seven and only one for two or 12. This makes it more likely to get seven than any other number. The next most likely sums would be six and eight.

Calculator Cycling

This is a bingo game in which the players try to cover four squares on the board in a row horizontally, vertically, or diagonally The players select two addends, predict which sum they will make, use the calculator to verify their answer, and, if correct, place the chip on the square.

Discuss how estimation will help them in this game. What other strategies will help a player to win. Distribute the game sheet entitled "Calculator Cycling" and bingo chips or beans to each player. Allow time for them to play.

Best Guess

In this game, students compete against adults in estimation. The students use a list of subtraction problems. The adults use a list of division problems. Each tries to estimate the answer accurately. Players verify their estimates with a calculator. The player whose estimate is closest on each round wins a point. At the end of the game, the player with the most points wins the game.

Homework

Estimate and Verify

This is an opportunity to practice estimation in a real-life setting. Student can do this independently or with an adult. They can even compare sock drawers, if they want to.

Addition Dash

This game is very similar to "Subtraction Dash" which was done in our session tonight (and is also included in the packet). Students and adults can play both at home together.

Subtraction Dash

Played tonight and shared in the packet for participants to revisit.

Bulls-Eye

Participants compete to give the closest estimate in a game very similar to **Best Guess**, the game that was played tonight.

Calculator Nim Games

These were shared in class but are included for use at home.

Closure

Review each of the warm ups.

Newspaper Archery: Have participants share their findings from the newspaper. Were there some types of numbers that were more difficult to find than others.

Namesake Weightlifting: Who lifts the most pounds in this group based on their name? What else does the graph show us?

- Where most names about the same in value?
- What number occurred the most?
- What number was in the middle?
- Were the adult names usually more valuable than the student names?
- What else did you notice?

Handful Handball: Are there patterns in the data displayed? Were the parents consistently able to hold twice as much as the students? More? Less? Does the color of the sticky notes help you to see patterns? Are the notes grouped in some way? Why?

Broad Jump Battle: Do we have Broad Jump Superstars in our midst? Or should we call them Estimation Superstars? Any reactions to this? We estimate in many ways and for many purposes, not just for computation.

Estimation Jar: (During the evening have one leader sort through the estimation responses and select the best one or two estimates.) Talk about strategies the participants used to arrive at their estimates. Announce the winner of the Estimation Jar contest and give them a prize (I Love Math button, math pencil, etc.) Remind participants that the Estimation Jar will be a part of each session during the Math Olympics 2000/2002.

Incentives to Return: Ask if the participants have enjoyed the evening. Talk about some of the topics you will explore in the next week or two. Remind them that next week is our last week together. Encourage them to return for more fun next week.

Distribute Packets: Distribute the packets to each pair of participants. Explain that some of the activities that they experienced tonight are also in the packet so they can revisit them during the week. In addition, there are several new activities for them to explore. Review the contents and answer any questions they may have.

Packet Contents:

Estimate and Verify
Addition Dash
Subtraction Dash
0-9 Spinner Sheet
Bull's-Eye
Calculator Nim Kayaking
Calculator Cycling

THINGS TO DO BEFORE SESSION THREE

Supplies to Gather or Purchase

nametags
colored markers or crayons
pencils
baskets for collecting estimates and surveys
estimation jar
contents for estimation jar
sticky notes
small pieces of paper for estimation responses
sticky notes - two colors
blank paper
masking tape
meter stick or tape measure to set up Broad Jump area
paperclips
chart paper
beans (two sizes), cube, macaroni, marbles, or buttons for Handful Handball
prizes for estimation awards
newspapers
scissors
clear tape
paper plates (four)
calculators
stop watch or clock with second hand
bingo chips or beans
dice (if not using 1-6 Spinners in Dice Dressage/Spinner Sailing)
paperclips for spinners

Things to Make

Signs for centers (Estimation, Nametags, Newspaper Archery, Namesake Weightlifting, Handful Handball, and Broad Jump Battle)
Fill Estimation Jar
Large Display for Newspaper Archery (optional – see prep)
Large graph for Namesake Weightlifting
Chart for Handful Handball

Papers to be copied for use DURING Session 3

- Directions for Handful Handball – 1 copy for center
- Directions for Broad Jump Battle – 1 copy
- Hundred Charts - for homework review
- Newspaper Archery Recording Sheet (or make large chart for all to use)
- Grid paper
- Broad Jump Battle Recording Sheet
- 0-9 spinners
- 1-6 spinners (if not using dice)
- Dice Dressage or Spinner Sailing Record Sheet
- Calculator Cycling
- Best Guess

Overhead Transparencies to Make for use DURING Session 3

- Newspaper Archery
- Hundred Chart for homework review
- Subtraction Dash
- Calculator Nim Kayaking
- Best Guess

Packet Contents to be copied for use at Home

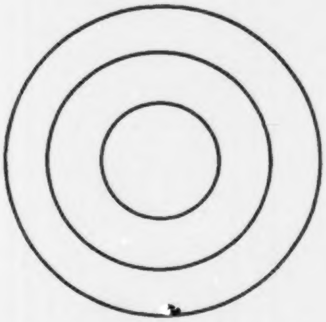
- Title Page
- Estimate and Verify
- Addition Dash
- Subtraction Dash
- 0-9 Spinner Sheet
- Bull's-eye
- Calculator Nim Kayaking
- Calculator Cycling

Session Three

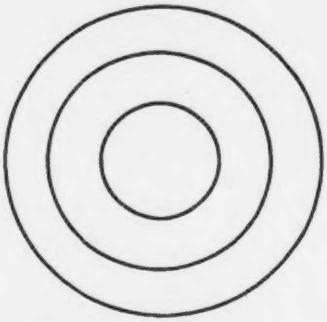
- √ Support Materials
- √ Masters of activities sheets
- √ Masters of Overhead Transparencies
- √ Master of Home Packet

Newspaper Archery

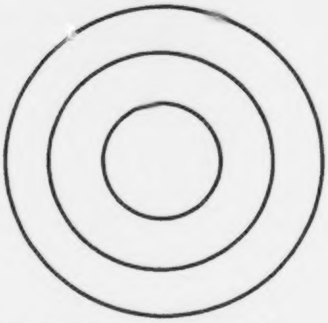
Use the newspaper to find examples of the following types of numbers. Write the example you find in the bull's-eye. Can you find more than one for each type of number? Make sure you can tell us where you found each one.



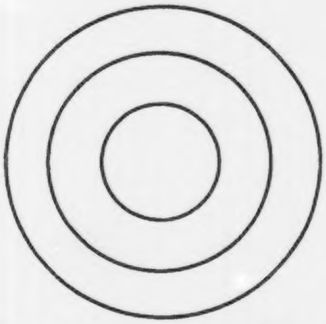
A money number



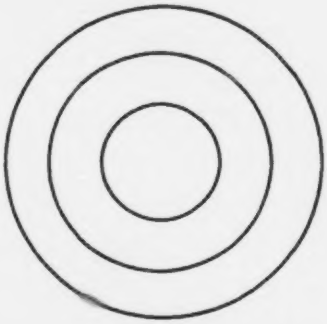
A temperature



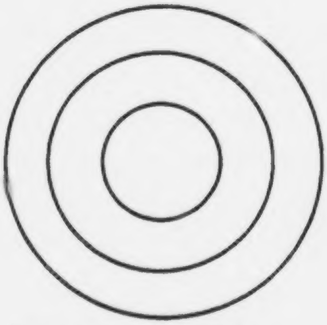
A telephone number



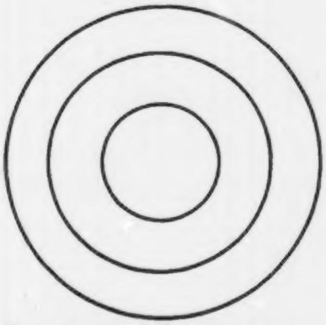
An estimated number



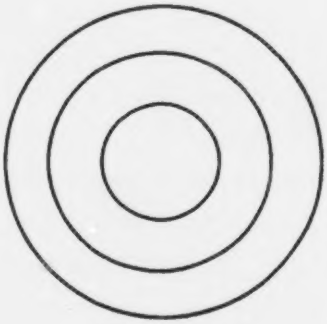
An age



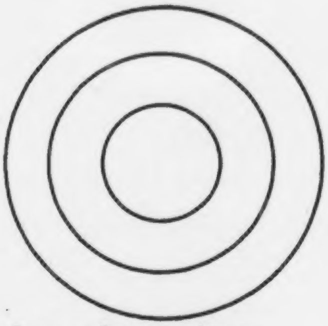
An exact number



A numeral between
100 & 500



A date



A number written
in words

Namesake Weightlifting

Are you the "Namesake" weightlifting champion of 2000/2002? Here's how to find out:

- Write your name (first and last) on a sticky note.
- Use the Letter Value Chart to figure out how many pounds your name is worth. Use a calculator, if needed.

A = 1
B = 2
C = 3
D = 4
E = 5
F = 6
G = 7
H = 8
I = 9
J = 10
K = 11
L = 12
M = 13
N = 14
O = 15
P = 16
Q = 17
R = 18
S = 19
T = 20
U = 21
V = 22
W = 23
X = 24
Y = 25
Z = 26

- Use the grid paper to cut out a bar that represents the value of your name. Use tape, if needed.
- Put your bar on the graph.
- Compare yours with those of the other participants.

If your bar is the tallest one on the graph, you are the NAMESAKE WEIGHTLIFTING CHAMPION of our school!!!!

Congratulation!! Hurrah!! Bravo!!

CENTIMETER GRID PAPER

Two-Centimeter Grid Paper

HANDFUL HANDBALL

How much can your hand hold? Do you think it's a lot or a little? Here's your opportunity to check it out.

- Get a sticky note. BE CAREFUL -- one color is for adults and one for students. Get the right color!
- Select one of the four plates of items.
- Estimate how many you think you can pick up in ONE HANDFUL. Write your name and your estimate on the sticky note.
- Pick up one handful. Count them.
- Write the actual amount that you picked up on your sticky note and draw a circle around it.
- Put your sticky note on the chart.
- Get another sticky note and move to the next plate. Repeat the steps above.
- Be sure to use what you learned the previous plate(s) to help you with your estimate for this one.
- Keep going until you have tried all four plates.

Broad Jump Battle

Welcome to the Battle of the Broad Jump!! Take a look at the track. How far do you think you can jump?

- Measure the length of your estimate.
- Write it down on the recording sheet next to "Jump One."
- Now step up to the jump line and JUMP!!
- Have your partner help you measure the actual length of your jump.
- Record it on your sheet.
- Compare your estimate to your actual jump.
- Think!!!

- Now estimate the length of your second jump and record it. Will your estimate be closer to your actual jump? Why do you think that?
- Okay...jump!
- Measure and record. Think!! Compare!!

- Now repeat the steps above again.
- Record a point for every estimate on your sheet that is within five centimeters of the actual jump.

Broad Jump
Battles
Record Sheet

Name________________________________

Jump Number	Jump Estimate	Actual Jump	Points Scored
		Total Points Scored	

HUNDRED CHART

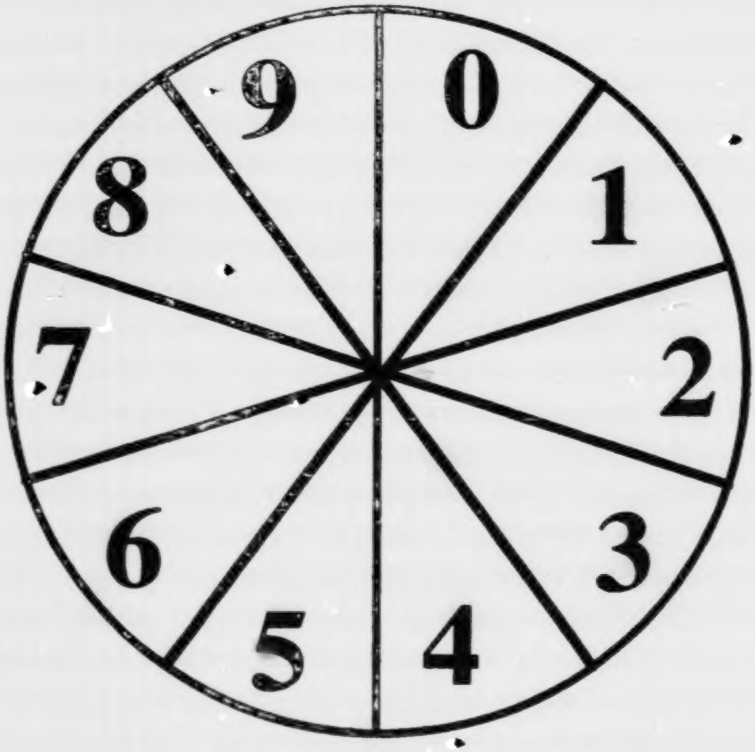
1	2	3	4	5	6	7	8	9	10
11	12	13	14	15	16	17	18	19	20
21	22	23	24	25	26	27	28	29	30
31	32	33	34	35	36	37	38	39	40
41	42	43	44	45	46	47	48	49	50
51	52	53	54	55	56	57	58	59	60
61	62	63	64	65	66	67	68	69	70
71	72	73	74	75	76	77	78	79	80
81	82	83	84	85	86	87	88	89	90
91	92	93	94	95	96	97	98	99	100

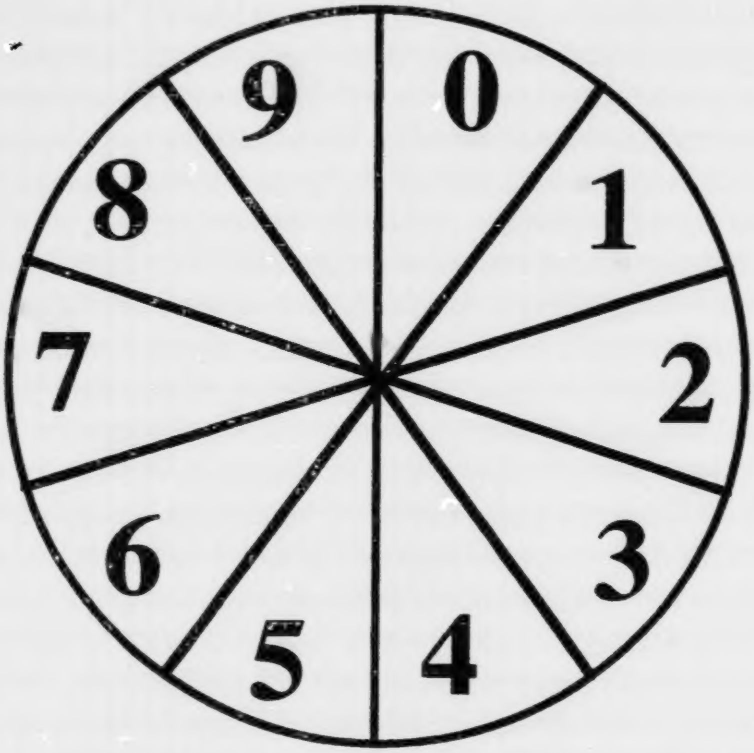
SUBTRACTION DASH

Materials: 0-9 spinner paperclip calculator
pencil paper

Directions:

- Spin the spinner two times to make a two digit number.
  (If you roll a 5 and 6, you can make 56 or 65. It's up to you!)
- Write the number on a piece of paper so that both players can see it.
- Each player spins the spinner once to get the number he or she will use as a constant.
- Both players push "clear" on their calculators and enter the 2-digit number written on the paper and count down "3...2...1...Go!
- The players each enter "-" and the individual number he or she got on the spinner.
- Each player hits the equal sign (=) repeatedly and counts the number of "hits" it takes to get to or past zero. The first there (with the least number of hits) is the winner and scores a point for that round.
- Repeat the steps to play 4 more rounds. The grand winner is the person with the most points after five rounds.





CALCULATOR NIM KAYAKING

Row to 13 (Players share a calculator.)

- Clear the calculator so it displays "0".
- Players take turns adding a 1 or 2 and pressing "=".
- First player to 13 wins. If a player goes over, he loses.

Down the Falls (Players share a calculator.)

- Clear the calculator so it displays "0".
- Enter a two-digit number.
- Players take turns subtracting 1, 2, or 3 and pressing "=".
- First player to zero exactly wins. Going into negative numbers (-3, for example) means you lose.

2000 Olympic Meet (Players share a calculator.)

- Clear the calculator so it displays "0".
- Enter "2000" on the calculator.
- Players take turns subtracting any number from 1 to 99 on each turn.
- The player who reaches zero EXACTLY wins!!

Your Event (Players share a calculator.)

- Make up your own game and rules.
- Choose an operation and starting number.
- Play to win but play fairly!

DICE DRESSAGE

2

3

4

5

6

7

8

9

10

11

12

SPINNER SAILING

2

3

4

5

6

7

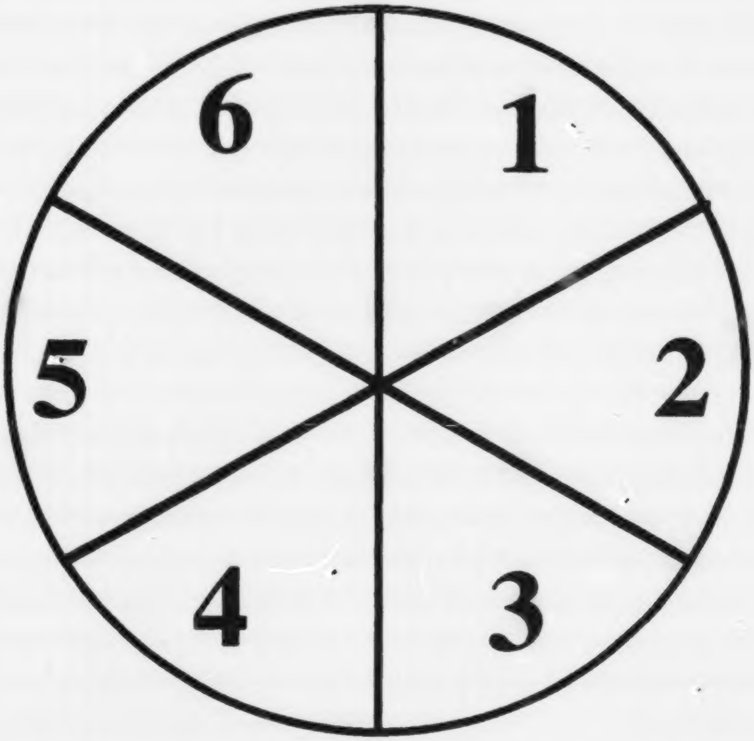
8

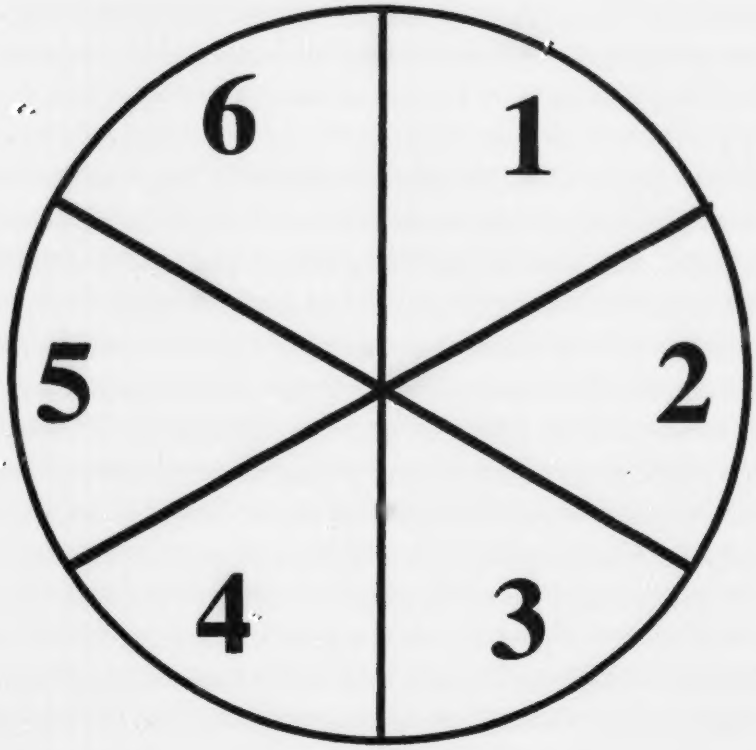
9

10

11

12





CALCULATOR CYCLING

This is a bingo game in which the players choose pairs of addends in order to try to place four markers in a row horizontally, vertically, or diagonally in covering sums of order to win the game.

- One each turn, the player select two addends and predicts which sum they will make.
- The player uses the calculator to verify his or her answer, and, if correct, places the chip on the square.
- The first player to have four markers in a row horizontally, vertically, or diagonally, wins the game.

Addend Choices								
7	13	24	16	33	18	3	47	29

36	76	16	54	63	42
48	80	40	49	20	51
31	62	27	25	40	37
21	57	29	67	31	53
45	10	47	42	36	50
71	32	60	23	34	46

Best Guess

Rules

- Students use the "Student" list of problems. Adults use the "Adult" list of problems.

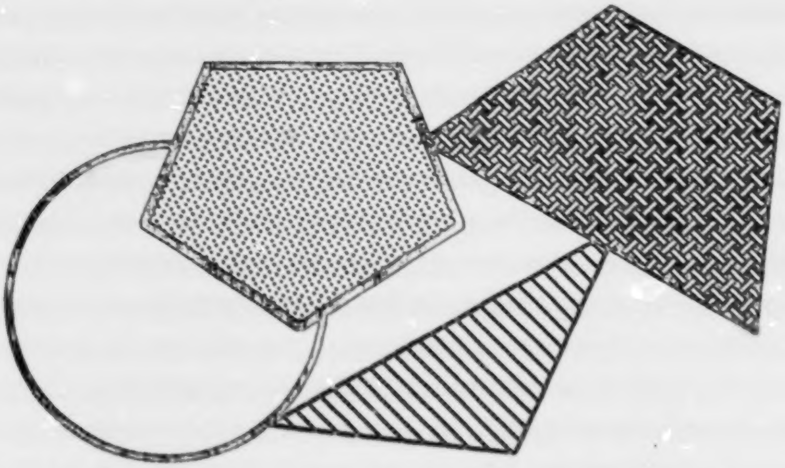
- Each player estimates the answer to Problem 1 in his or her list. Be sure to write down your estimate. You should decide how much time to allow for each estimate.

- Now use a calculator to determine the correct answer. The player whose estimate is closest gets one point. Continue with the rest of the problems using the same rules.

Student List	Adult List
1. 500 - 26	1. 500 ÷ 26
2. 70 - 18	2. 700 ÷ 18
3. 420 - 63	3. 4200 ÷ 63
4. 634 - 15	4. 634 ÷ 15
5. 80 - 41	5. 8000 ÷ 41
6. 515 - 60	6. 5150 ÷ 60
7. 93 - 34	7. 930 ÷ 34
8. 100 - 25	10. 1000 ÷ 25

MATH
OLYMPICS
2000/2002

Primary Mathematics Fun
for Communities of Children and Adults
to Share at Home



Week Three

ESTIMATE AND VERIFY

Task One

Open up your sock drawer. Estimate the number of socks it contains. Write down your estimate. Now count them (and maybe even make them neater). Write down the exact answer. Were you close?

Estimate	Exact Amount

Task Two

Look in your toy chest, Gameboy collection, or whatever special stuff you have. About how many do you have? Write down your estimate. Now count them. Were there more than you thought?

Estimate	Exact Amount

Task Three

Go to the kitchen. Fill a bowl with Cherrios, Rice Chex, or some other cereal that has same-sized pieces. Estimate how many you poured into the bowl. Write down your estimate. Now count them (and taste them). Were you close? Are they good? Enjoy!

Estimate	Exact Amount

ADDITION DASH

Materials: 0-9 spinner paperclip calculator
pencil paper

Directions:

- Spin the spinner two times to make a two-digit number. (If you roll a 5, and 6, you can make 56, or 65. It's up to you!)

- Write the number on a piece of paper so that both players can see it. This is your target number.

- Each player spins the spinner once to get the one-digit number he or she will use as a constant.

- Both players push "clear" on their calculators and enter "+" and his or her constant number. Together they count down "3...2...1...Go!

- Each player hits the equal sign (=) repeatedly and counts the number of "hits" it takes to get to or past the target number. The first there (with the least number of hits) is the winner and scores a point for that round.

- Repeat the steps to play 4 more rounds. The grand winner is the person with the most points after five rounds.

Variations: Change the number of digits in the target.
Use multiplication instead of addition.

SUBTRACTION DASH

Materials:	0-9 spinner	paperclip	calculator
	pencil	paper	

Directions:

- Spin the spinner two times to make a two digit number.

  (If you roll a 5 and 6, you can make 56 or 65. It's up to you!)

- Write the number on a piece of paper so that both players can see it.

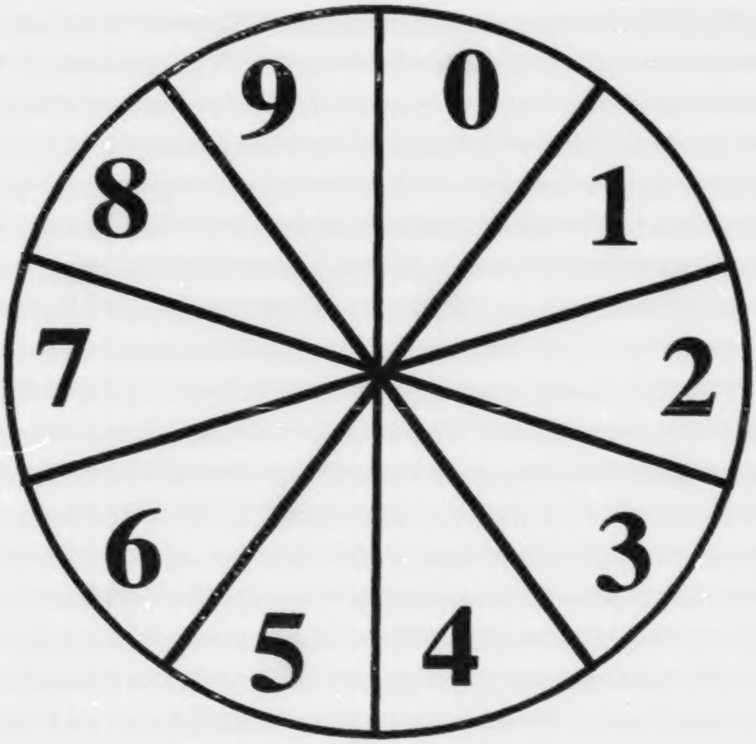
- Each player spins the spinner once to get the number he or she will use as a constant.

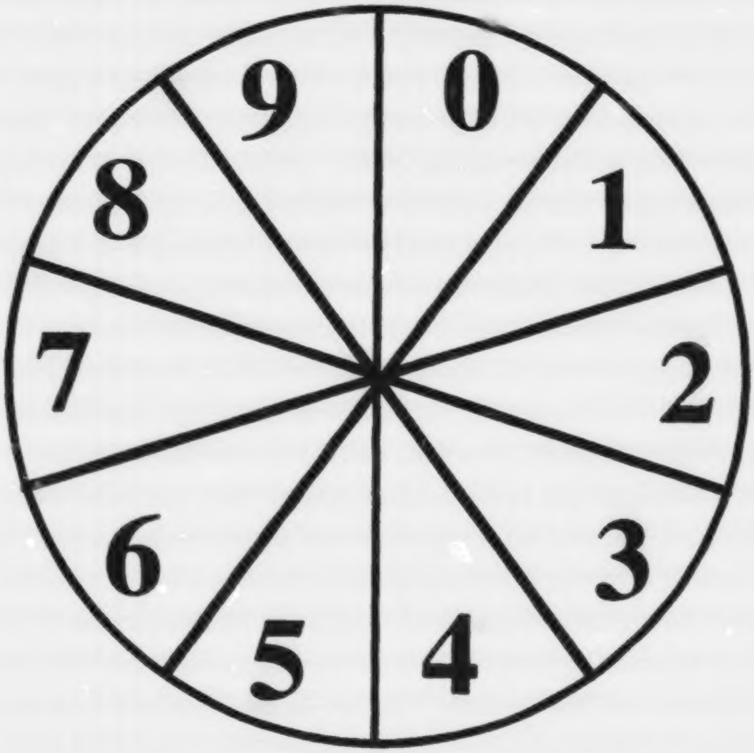
- Both players push "clear" on their calculators and enter the 2-digit number written on the paper and count down "3...2...1...Go!

- The players each enter "-" and the individual number he or she got on the spinner.

- Each player hits the equal sign (=) repeatedly and counts the number of "hits" it takes to get to or past zero. The first there (with the least number of hits) is the winner and scores a point for that round.

- Repeat the steps to play 4 more rounds. The grand winner is the person with the most points after five rounds.





Bull's-Eye

Rules

- Students use the "Student" list of problems. Adults use the "Adult" list of problems.
- Decide how much time to allow for each estimate.
- Each player estimates the answer to Problem 1 on his or her list and writes down that estimate.
- Then use a calculator to get the exact answer. The player whose estimate is closest to the exact answer gets one point.
- Complete the rest of the problems using the same rules.

Student List	Adult List
1. 41 - 13	1. 4100 ÷ 13
2. 238 - 39	2. 2399 ÷ 39
3. 700 - 65	3. 7002 ÷ 60
4. 108 - 21	4. 1008 ÷ 21
5. 600 - 26	5. 6000 ÷ 26
6. 97 - 29	6. 9730 ÷ 9.9

CALCULATOR NIM KAYAKING

Row to 13 (Players share a calculator.)

- Clear the calculator so it displays "0".
- Players take turns adding a 1 or 2 and pressing "=".
- First player to 13 wins. If a player goes over, he loses.

Down the Falls (Players share a calculator.)

- Clear the calculator so it displays "0".
- Enter a two-digit number.
- Players take turns subtracting 1, 2, or 3 and pressing "=".
- First player to zero exactly wins. Going into negative numbers (-3, for example) means you lose.

2000 Olympic Meet (Players share a calculator.)

- Clear the calculator so it displays "0".
- Enter "2000" on the calculator.
- Players take turns subtracting any number from 1 to 99 on each turn.
- The player who reaches zero EXACTLY wins!!

Your Event (Players share a calculator.)

- Make up your own game and rules.
- Choose an operation and starting number.
- Play to win but play fairly!

CALCULATOR CYCLING

This is a bingo game in which the players choose pairs of addends in order to try to place four markers in a row horizontally, vertically, or diagonally in covering sums of order to win the game.

- One each turn, the player select two addends and predicts which sum they will make.
- The player uses the calculator to verify his or her answer, and, if correct, places the chip on the square.
- The first player to have four markers in a row horizontally, vertically, or diagonally, wins the game.

Addend Choices

7 13 24 16 33 18 3 47 29

36	76	16	54	63	42
48	80	40	49	20	51
31	62	27	25	40	37
21	57	29	67	31	53
45	10	47	42	36	50
71	32	60	23	34	46

SESSION FOUR

Data Collection and Probability

Math Olympics 2000/2002 - Session 4
Topic: Data Collection and Probability

Warm Ups
- Nametags
- Estimation Jar
- Birthday Graph
- Coin Flip Wrestling - Is It Fair?
- Bean Bag Decathlon
- Rocks, Paper, Scissors

Welcome Back
- Welcome
- Share homework results from participants

Activities
- How Likely Is It?
- Favorite Color Fencing
- Mystery Bag Boxing - Which Do I Have? Which Do You Have?
- Spinner Olympics - Is It Fair?

Homework
- No Homework - this is last session

Closure
- Review of warm ups, hand out prize(s) for estimation jar
- Hand out Certificates of Participation
- Evaluation of Program

Math Olympics 2000/2002 - Session 4
Topic: Data Collection and Probability
(Primary Grades)

Description of Activities and Preparation for Session Events

Set Up of Room

The room in which you hold Math Olympics 2000/2002 should be large: the cafeteria, the media center or library, or an open area. You will need tables centered before an overhead projector for participants to sit at during the main activities of the sessions. You will also need tables around the outskirts of the room for the Warm Up activities at the beginning of the evening. You will want a table for the Nametags near the door. You may also want a refreshment table if you plan to break halfway through the night for refreshments.

You may want to place baskets or boxes on each table that hold the materials needed for the main activities of the evening. Think about how best to organize your materials to eliminate "down-time" while waiting to dispense supplies.

Warm Ups

(The Warm Ups should go very well tonight as participants are used to the routine.)

Nametags

Set up the Nametag Table with individual nametags so that everyone participating (leaders, children, and parents) has his or her name visible for others to see.

Display the sign for the Nametag Table that encourages people to sign. Make a Sign-In Sheet, if desired, to keep track of who attends.

As the parents and children arrive, have one leader greet them and point them toward the Nametag Table. Have colored markers available for the participants to write their names on the nametags.

After they sign in, encourage families to move to the other centers to begin exploring the warm-up activities.

Estimation Jar

Each week fill the estimation jar (a quart mayonnaise jar or larger) with one kind of item (small dog biscuits, superballs, jar breakers, Hershey Kisses, etc.) Count the items prior to the night of the event, write the number of items in the jar on a piece of paper and tape it to the inside of the lid of the jar.

Display the sign for the “Estimation Jar” at a warm-up center.

Encourage participants are to record their estimates of how many of the item chosen for that week are in the jar.

Place pencils and pieces of paper near the jar on which participants can write their estimates and name. Place a basket near the jar in which participants can place their estimates.

Birthday Graph

Hang a big piece of bulletin board paper or use a chalkboard. Make the basic set up for a pictograph of Birthday Months. Label the 12 months and have cut-out shapes or sticky notes for each person to label with his or her name and place on the graph to show his/her birth month. If you want to compare male and female birthday’s, use two different color cut-outs or sticky notes.

Coin Flip Wrestling - Is It Fair?

Adult and student flip coins in a game and decide if it is a fair game.

Bean Bag Decathlon

Hang bulletin board paper and create the frame of a double bar graph for participants to post their results. Each pair posts their results as a double bar. Run 2-centimeter grid paper for participants to create their portion of the graph. Parent and student compete trying to toss a bean bag into a trash can. They post their results on a double bar graph with students using one color marker or crayon and parents another.

Rocks, Paper, Scissors
Participants will play the game "Rocks, Paper, Scissors" and record their results. Later the group will discuss the strategies they found effective and how probability played a part in their winning or losing.

Welcome Back

Welcome Back and Homework Check

Gather your participants to the tables centered in front of the overhead projector. Welcome them back with "Olympic" enthusiasm and reintroduce all leaders involved in the program.

Ask if any of the participants have any feedback to share from the homework last week. Did any sock drawers get amazingly neat and organized? Allow participants time to share, if desired.

Explain that the focus of this session is Data Collection and Probability. Tonight we will be doing activities that model for us how often we rely on probability and data collection in everyday life. Just getting dressed in the morning involves probability. What are the chances of rain today? If the room is dark, what are the odds I will pull matching socks out of my drawer? The odds are with you if you cleaned out the drawer last week! Remind the participants that they have already employed probability and data collection in the warm-ups!

Activities

How Likely Is It?

Display the five signs across the chalkboard or wall in the front of the room to make a continuum:

Impossible	Less Likely	Equally Likely	More Likely	Certain

Show the group one of the statements included in the Support Materials for this session:

There are adults and students in this room.
Your teacher will never assign homework again!!
You will have fun tonight.
Someone in this room will live on another planet in the future.

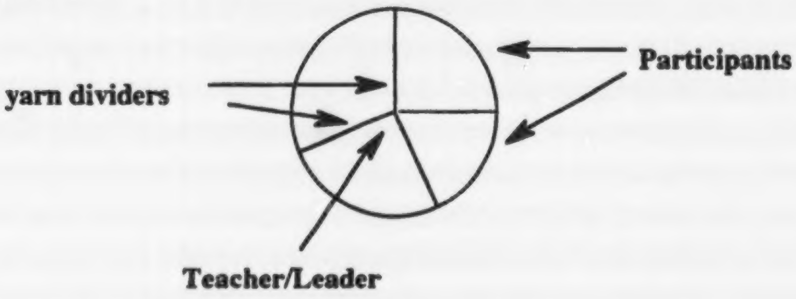
Ask the group to decide where each should go on the continuum from Impossible to Certain. Discuss. Then give each pair of participants two blank sheets of paper. Ask them to write a statement on each that would fit somewhere along the continuum. Have each pair present their statements and allow the group to decide where to hang each.

Talk about how we use this kind of thinking each day in our lives. *Should I take an umbrella? What are the odds our High School team will win the championship? Will I pass the test if I do not study?*

Favorite Color Fencing

Display a variety of colored paper. Ask each participant to pick up one piece of their favorite color. Then lead them to an open area. Take long pieces of yarn and extra colored paper (optional).

Ask the participants to group themselves by color (all the reds together, the blues, etc.). Then ask them to stay together as a group, hold their paper in their hand, and join the other groups to make a circle around you. Explain that you are the center point of the circle. Ask them to stand shoulder-to-shoulder so the circle is closed. As the participants standing at the point where two groups meet to hold one end of a piece of yarn while you hold the other. Do this with each point where two groups meet.



This forms a human circle graph. It is a concrete representation of data. Discuss why one group is larger than another.

Ask questions such as:

> *About how many more people like red than green?*
> *Are they any parts of our graph that are equal?*
> *What fractional part of our graph is yellow? Blue?*
> *Could we write a number sentence to describe this graph?*

Instruct your participants to place their paper on the floor at the spot where they are standing. Ask the people holding the yarn to place it on the floor (or use masking tape to mark where the yarn would be). Have everyone step back so they can see the pictorial circle graph made from the human graph. You may fill in each section of the graph with the extra colored paper that matches, if you like (optional) to make it more realistic.

If you have a computer available and a way to display it for the group, put the data from the circle graph into the computer and display this graph again, but this time it is an abstract representation of the data. Discuss how all three are very similar, just different sizes and made up of different materials.

Mystery Bag Boxing - Which Do I Have? Which Do You Have?

In this probability activity, participants must determine the color of the contents of a bag **without** looking inside the bag. They collect data by taking samples from the bag, construct a bar graph of their results, and then try to find the other pair of people in the room that have a bag with the same color contents as they have. Pairs match up and **THEN FINALLY** look inside the bags to see if their predictions are correct.

Prior to Session 4, put cubes, chips, or paper squares in bags to so that you have an equal number of bags with identical contents. Use the "Mystery Bags" overhead transparency master as a guide. Fill bags to match each of the bags displayed in this transparency. All bags will match one of the following:
Bag 1: 4 green, 4 red, 4 yellow
Bag 2: 2 green, 8 red, 2 yellow
Bag 3: 1 green, 2 red, 9 yellow
Do not mark the bags in any way.

Distribute the bags randomly to the pairs in your group. Prior to handing them the bags, make them promise NOT to look in the bag.

Explain that each bag has some green cubes (chips, or whatever), some red, and some yellow. Ask how we could figure out how many of each color is in the bag if we cannot dump it out or look in it. Elicit from the participants that we could take a sample by drawing one cube out and replacing it and then repeating this many times.

Discuss how many times we would have to pull from the bag to get an accurate picture of the contents. Have the pairs pull about 24 (or 36, if you prefer) times and record their results on paper. A recording sheet is included in the support materials for this session if you want to use it. Your participants could use a blank piece of paper to record their data just as easily.

Ask the participants to use this data to begin to predict the color contents of their bag. Then do the following:

Distribute the centimeter or 2-centimeter grid paper. Ask your participants to construct a bar graph using the grid paper that represents the data they collected from their 'pulls' from the bag. Provide crayons or markers for them to use.

Once the graphs are completed, ask the pairs to stand up. Ask one member of each group to hold the CLOSED bag (We STILL haven't looked inside!) and the other to hold up the graph so that all the other participants can see it. Have the pairs use their graphs to try to find the other pair that most likely has the same color combination in their bag as they have.

Discuss why some pairs may have difficulty finding their matching pair. Once all pairs have matched up (or some have been unable to find a match, have the pairs open up their bags to check their predictions. Discuss the results. What fractional part of their contents were red? Was it more or less than half? How do you know? Did their graphs truly represent the contents of the bags? Why or why not?

Have matching pairs combine their data to see if the total gives a more accurate picture of the contents of their bags. Discuss size of sample and its importance in data collection.
Allow participants time to react to the investigation. Discuss how it combined problem solving, data collection, probability, fractions, and reasoning in one activity. Reinforce the idea that this is how students need to be able to use math in today's world: not rote learning but application of arithmetic, mathematical thinking, and reasoning.

Spinner Olympics - Is It Fair?

Display an overhead transparency of the "Spinner Olympics" game sheet. Review the rules of the game. Distribute paperclips, pencils, and blank paper for participants use and allow time for them to play and discuss the game. Have students and adults share their conclusions about the game and how they would change it.

Note: The game is not fair. Sums equal to 9 or less have almost twice as many ways to win as sums of 10 or more:

Sums of 9 or Less	Sums of 10 or More
3 + 3 = 6	4 + 6 = 10
3 + 4 = 7	5 + 5 = 10
3 + 5 = 8	5 + 6 = 11
3 + 6 = 9	6 + 4 = 10
4 + 3 = 7	6 + 5 = 11
4 + 4 = 8	6 + 6 = 12
4 + 5 = 9	
5 + 3 = 8	
5 + 4 = 9	
6 + 3 = 9	

One possible way to make it fair is to change the rule to odd and even sums. One player gets a point if the sum is odd. The other player gets the point if the sum is even. There is an equal chance of rolling odd or even. That makes the game fair:

Even	Odd
3 + 3	3 + 4
3 + 5	3 + 6
4 + 4	4 + 3
4 + 6	4 + 5
5 + 3	5 + 4
5 + 5	5 + 6
6 + 3	6 + 3
6 + 6	6 + 5

Homework

(There is no homework and no packet since this is the last night of the program.)

Closure

Review each of the warm ups.

Birthday Graph: Have participants discuss the data displayed on the graph. Is there one month that has many more birthdays than others? Male birthday versus females?

Coin Flip Wrestling: Was it a fair game? How do you know? Would you change it? Why or why not?

Bean Bag Decathlon: Review the double bar graph. Is there a consistent pattern of performance between the students and the parents? What do you notice? Discuss. Who is the best Bean Bag Decathlon Athlete?

Rocks, Paper, Scissors: What did the data tell you about this old, old game? Is there a strategy that works consistently. Let the participants decide.

Estimation Jar: (During the evening have one leader sort through the estimation responses and select the best one or two estimates.) Talk about strategies the participants used to arrive at their estimates. Announce the winner of the Estimation Jar contest and give them a prize (I Love Math button, math pencil, etc.)

Certificate Ceremony: Congratulate the participants for their efforts over the last four weeks. Remind them of some of the terrific moments you shared.

Explain that each participant will receive a Certificate of Participation for having **ACTIVELY** participated each night. Call each participant to the front of the room to receive his or her certificate.

Evaluation of Program: Distribute the evaluation forms to each person attending. Ask that they complete it honestly so that you will know what works and what needs to be changed.

Farewells and Thanks: (You can handle this!)

Congratulations! You did it! Great job! We hope you had as much fun as the participants did!

THINGS TO DO BEFORE SESSION FOUR

Supplies to Gather or Purchase

- nametags
- colored markers or crayons
- pencils
- baskets for collecting estimates and surveys
- estimation jar
- contents for estimation jar
- small pieces of paper for estimation responses
- birthday graph symbols (two colors)
- bulletin board paper for graphs
- blank paper
- masking tape
- paperclips
- chart paper
- coins
- bean bags
- clear tape
- yarn
- colored paper (a variety of colors)
- paper bags
- colored cubes, chips, or squares of paper for Mystery Bags (red, blue, green, and yellow

Things to Make

- Signs for centers (Estimation, Nametags, Birthday Graph, Coin Flip Wrestling, Bean Bag Decathlon, and Rocks, Paper, Scissors)
- Fill Estimation Jar
- Large graph for Birthday Graph
- Large graph for Bean Bag Decathlon
- Birthday shapes, if not already cut

Papers to be copied for use DURING Session 4

- Directions for Birthday Graph – 1 copy
- Directions for Bean Bag Decathlon – 1 copy
- Directions for Rocks, Paper, Scissors – 1 copy
- Coin Flip Wrestling
- Grid Paper for Bean Bag Decathlon

Papers to be copied for use DURING Session 4 (continued)

- Rocks, Paper Scissors Scoresheet
- Single copies of the "How Likely" signs
- Single copies of the "How Likely" statements
- Mystery Bag Tally Sheet
- Grid Paper for Mystery Bag Graphs
- Spinner Olympics – Is It Fair?
- Math Olympic Certificates of Participation (on colored paper)
- Evaluation Forms

Overhead Transparencies to Make for use DURING Session 4

- Mystery Bags
- Spinner Olympics – Is It Fair?

Session Four

√ Support Materials

√ Masters of activities sheets

√ Masters of Overhead Transparencies

√ Master of Home Packet

BIRTHDAY GRAPH

Get a tag and put your name on it. Place it on the graph to show the month of your birthday.

Coin Flip Wrestling

(Is It Fair Competition?)

Materials:

2 coins - one for each player

Rules:

Both players flip a coin.

If the coins land the same (both heads or both tails) the adult gets a point.

If the coins land differently (one heads and one tails) the student gets a point.

Play the game for at least twenty rounds. Record your results below. Then decide:

Is it a fair game?

Do both players have an equal chance of winning?

Be prepared to explain your thinking!!

Both Heads or Both Tails	**One Heads and One Tails**

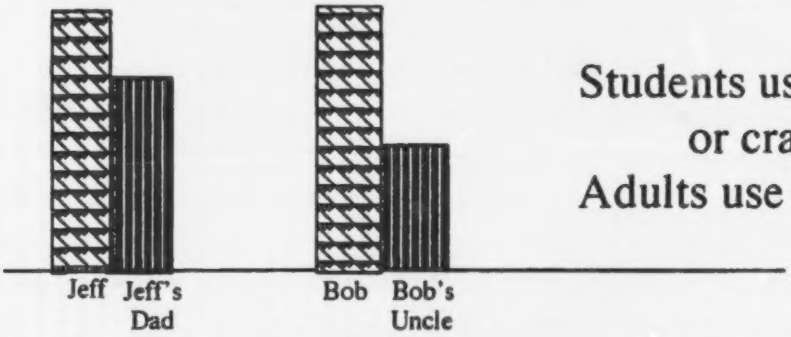
BEAN BAG DECATHLON

In this game, adults compete against students to make as many baskets as possible with a bean bag and a trash can.

Game Rules:

- Both players must stand behind the shot line when shooting.
- No one may interfere with a players shot.
- Students face the basket (aka trashcan) and shoot.
- Adults turn their back to the basket and shoot over their shoulder.
- Each player gets three practice shots before beginning competition.
- If the adult makes the first three shots, he or she must shoot the next seven with eyes closed.
- Each player is responsible for keeping track of the score. Each player gets 10 shots.

When you have finished your competition, grab some grid paper and make a double bar for the group graph. Hang your results and compare with other pairs.



Students use red marker
or crayon.
Adults use blue.

Two-Centimeter Grid Paper

ROCKS, PAPER, SCISSORS

Game Rules:

- Players face each other each holding one hand out in from of him or her.
- Each player hold his/her hand in a fist and shakes it saying "Rocks, paper, scissors."
- As scissors is said, each player has three choices:
  - keep the hand in a fist (meaning rock)
  - hold the hand open and flat (meaning paper)
  - hold the hand in partial fist with two fingers sticking out (meaning scissors).
  -

Scoring:

A player gets one point each time he or she wins a round.

If players show:	Then:
paper & rock	paper wins (paper covers rock)
paper & scissors	scissors win (scissors cut paper)
rock & scissors	rock wins (rock breaks scissors)

Use the score sheet to keep track of not only *who won* but also *what item won.*

Be prepared to discuss your strategy for winning. Did it work? Be ready to share.

PAPER, ROCKS, SCISSORS SCORESHEET

Player's Name ________________________

Number of Games Won	***With Rocks***	***With Paper***	***With Scissors***

Player's Name ________________________

Number of Games Won	***With Rocks***	***With Paper***	***With Scissors***

Impossible

Less Likely

Equally Likely

More Likely

Certain

There are
adults and
students in this
room.

Your teacher
will never
assign
homework
again!!

You will have fun tonight.

Someone in this room will live on another planet in the future.

Mystery Bags

Bag #1 has:
4 green
4 red
4 yellow

Bag #2 has:
2 green
8 red
2 yellow

Bag #3 has:
1 green
2 red
9 yellow

Which do we have?

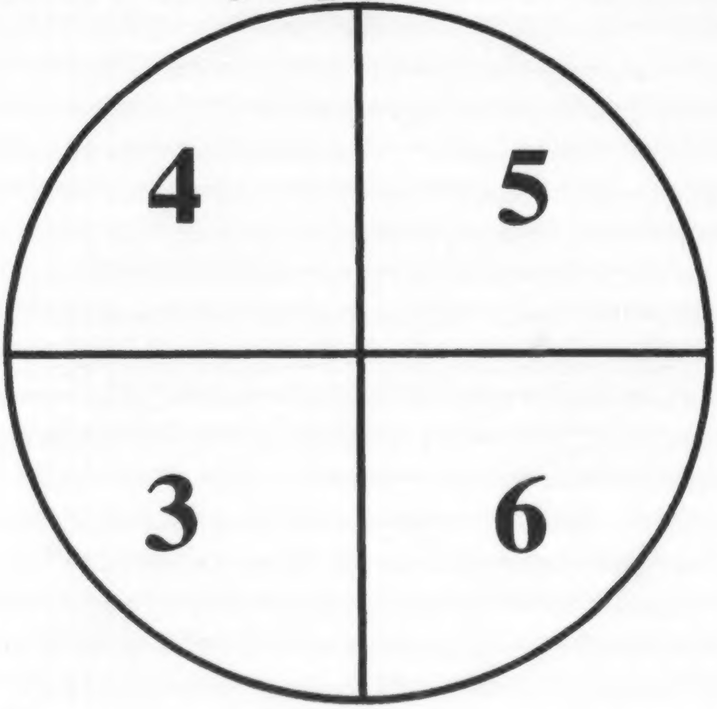
TALLY SHEET

We think we have Bag ____ because:

CENTIMETER GRID PAPER

Two-Centimeter Grid Paper

Spinner Olympics - Is It Fair?



Game Rules:

- Players take turns.
- On each turn a player spins twice and adds the two numbers.
- If the sum is equal to or less than 9, the student gets a point.
- If the sum is equal to or greater than 10, the adult gets a point.
- Record your results for at least 20 turns.

THEN:

Discuss with your partner whether this is a fair game or not. Do both players have an equal chance of winning. Why or why not?

If the game is not fair, how would you change it to make it fair? Be ready to share your ideas.

MATH OLYMPICS 2000/2002
EVALUATION

My favorite part of *Math Olympics* is . . .

If I could change one thing about *Math Olympics*, I would change . . .

Would I recommend *Math Olympics* to a friend?
___Yes ___No Why?

In Pursuit of Excellence in Learning

This certifies that

____

has successfully completed the Math Olympics
2000/2002

this __________ day of ______________ 200_

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